



First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

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## Flight.

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## EDITORIAL COMMENT.

An  
"Industrial  
Army"  
Badge—  
for King  
and Country.

The methods of the War Office in enlisting new recruits for the army have from time to time, since the outbreak of hostilities, called forth many criticisms, one of the chief of which is, that the work has not been carried out on lines likely to have such prompt results as would have been the case if the needs of our military authorities for the defence of the country and its honour had been brought home to the young men of the nation in a more palatable manner.

Although somewhat late in the day, it is satisfactory to find that this is now being recognised and that the order has gone forth that, for example, military bands shall be more freely used in aiding the recruiting officials to steadily add new names to the roll. That we shall, in the long run, get all the men required by Lord Kitchener, we have not the slightest doubt, but the fact remains that a much larger number of men would have already been under training if the War Office had set out to obtain the men who were required by making use of more popular forms of appeal, and had they been ready to properly house and take care of them when enrolled.

At Home Now that the need for enlisting recruits at a more rapid rate and by more healthy as well as at the Front. means has been realised, it is to be feared that the enthusiasm of some of the would-be recruiting agents is overstepping the mark of common sense and sound judgment. It has even been seriously suggested—although we are glad that it has been condemned in more than one quarter—that a white feather should be offered, by way of indicating contempt, to all able-bodied men not wearing the King's uniform, and that, furthermore, the fair sex should give the cold shoulder to all eligible men who have not offered their services to the country.

A little calm reflection should, however, we think, bring the public to realise that not only is it not possible for every available man to join the colours, but that the reverse is highly and vitally important. In other words, there are hundreds of thousands of men who, working as they are in every branch of industry on the production of material urgently required for our Army and Navy in the great and Imperial task we have on hand, while ready and willing to enlist, are, by sticking to their posts in the factories and workshops, rendering just as great, if not greater, service to their King and Country. While we readily agree that the men in the firing line have undoubtedly to undergo the great brunt of the risks and danger of the actual fighting in the colossal struggle now in progress—and all honour to them for the way they are gloriously upholding the reputation of the British Empire—yet the veriest tyro will, or should, appreciate the fact that without an equally vast army of men available for maintaining supplies of food, ships, motor vehicles, clothing, ammunition, &c., and for their distribution to the front, and another equally vast army of workers at home to keep up a steady output of supplies of all kinds, the work of our "contemptible Army" would be very quickly brought to a standstill. Although such a fact should be obvious, it is to be feared that the public do not as yet generally realise that it is absolutely necessary for large numbers of workmen to be retained to keep our factories running, for we regret to have to record the fact that reports are still reaching us from different parts of the United Kingdom to the effect that such workmen are being taunted for not having answered the call for recruits.

It is not unnatural that the workmen, realising the need for their services in the workshops, should resent taunts of this kind, and that they are leaving an unpleasant effect

behind is seen in the growing demand for some form of badge that may be worn in order to indicate that the wearer is serving his country in this critical time just as much as the man in uniform. We have already advocated action in this direction, and that this is viewed with favour by those at the head of our Admiralty and War Office is indicated by the official letters that have been sent out to all firms and companies engaged on the production of material for those departments. Thus, from the War Office, Lord Kitchener sent out a letter in which he states that :—

" I wish to impress upon those employed by your company the importance of the Government work upon which they are engaged. I fully appreciate the efforts which the employees are making, and the quality of the work turned out. I trust that everything will be done to assist the military authorities by pushing on all orders as rapidly as possible. I should like all engaged by your company to know that it is fully recognised that they, in carrying out the great work of supplying munitions of war, are doing their duty for their King and Country equally with those who have joined the Army for active service in the field."

Similarly, Capt. Murray F. Sueter, R.N., the director of the Air Department, Admiralty, has issued a letter to firms engaged in the aircraft industry in the following terms :—

" I wish to draw your attention, and that of your employees, to the very important service which can be rendered by them to the country by making every effort in their power to accelerate delivery of the air-craft ordered from you by the Admiralty.

" The need for these air-craft is most pressing, and I would be glad if you would point out to your employees that their duty to their country demands that they should exert themselves as much as lies in their power to complete the machines.

" In supplying efficient machines to our wing on active service, they are doing just as good work as those who are called to the front.

" I must point out that great care should be taken by all to guard against any lowering of the present standard of workmanship on account of working at high pressure.

" Perhaps you will be good enough to draw the attention of your employees to this."

\* \* \*

**An Official Badge Wanted.** In order to meet the strongly-expressed wishes of their employees, so as to place them in a position of being able to produce evidence to rebut any taunts in respect of their non-enlistment in the Army or Navy, quite a number of firms, especially among those engaged on automobile and aircraft work, have responded to the demand by issuing cards in the name of each individual employee so engaged. On the back of these cards is printed a copy of one or other of the above-quoted letters and, on the front, a reproduction in colours of the British Flag, the name and address of the firm, and the words :—

" Mr. —— is serving his country by using his best endeavours and work in connection with the building of —— for the British Government."

While such cards to a certain extent meet the case, they only partially satisfy the requirements, and, hence, we again give voice to a suggestion we have already advanced, and that is, that the Admiralty and the War Office should undertake the issue of an official badge which persons employed on the production of material for the Government necessary to our Empire winning through, should be able to wear on their coats or caps and so give visible indication to the general public that, although not wearing khaki, they are, none the less, serving their King and Country.

\* \* \*

**Suggested Badges.** It would, of course, be a matter for the Government authorities to decide whether such a badge should be of a uniform design for all branches of industry so engaged, or whether a special one should be prepared for each or any par-

ticular trade. In order to emphasise the matter, and supply a basis to work upon by those in charge of our naval and military departments, we have prepared the accompanying designs of suggested badges—a general one, and alternately a special one for the aircraft industry,



in which we are naturally mainly interested—that might advantageously be issued. It is immaterial which is selected, so that the idea of issuing an official badge is promptly taken up.

So great is the need for such an outward sign of public service felt in many quarters that several firms connected with the aircraft industry have issued, or intend to issue, in addition to the cards alluded to above, badges to their employees somewhat on the lines suggested. That these badges, especially if officially authorised, would be appreciated, is evident by the many enquiries we have received from workmen not yet supplied with the unofficial buttons as to where they may be procured. While the firms who have already tried to meet the case are to be congratulated on their thoughtfulness, the plan is far from being general, and it is on these grounds that we consider the question is one for the nation rather than for individual firms, and that we advocate the issue by the Admiralty and War Office of an official badge. It should also put a stop to the possibility of the abuse of unofficial badges. There need be no difficulty in regard to their distribution to the workmen entitled to them, as this could be undertaken by the firms whose names appear on the list of Government contractors, and to whom a certain number could be issued *en bloc* duly numbered. A bond in proper form could be given by each employee acknowledging the badge as the property of the Government, and undertaking to give up to the individual employer such badge upon the termination of his employment with the firm through whom it was issued.

We have dealt rather lengthily with this matter because we feel that it is one of considerable and far-reaching moment. Success against the enemy cannot be ensured only by men at the front; men in the factories and workshops are equally necessary for the national cause, and hence deserve some badge—no matter how small—to indicate that they are "O.H.M.S." and doing their full share of the work in maintaining the honour of the Empire.

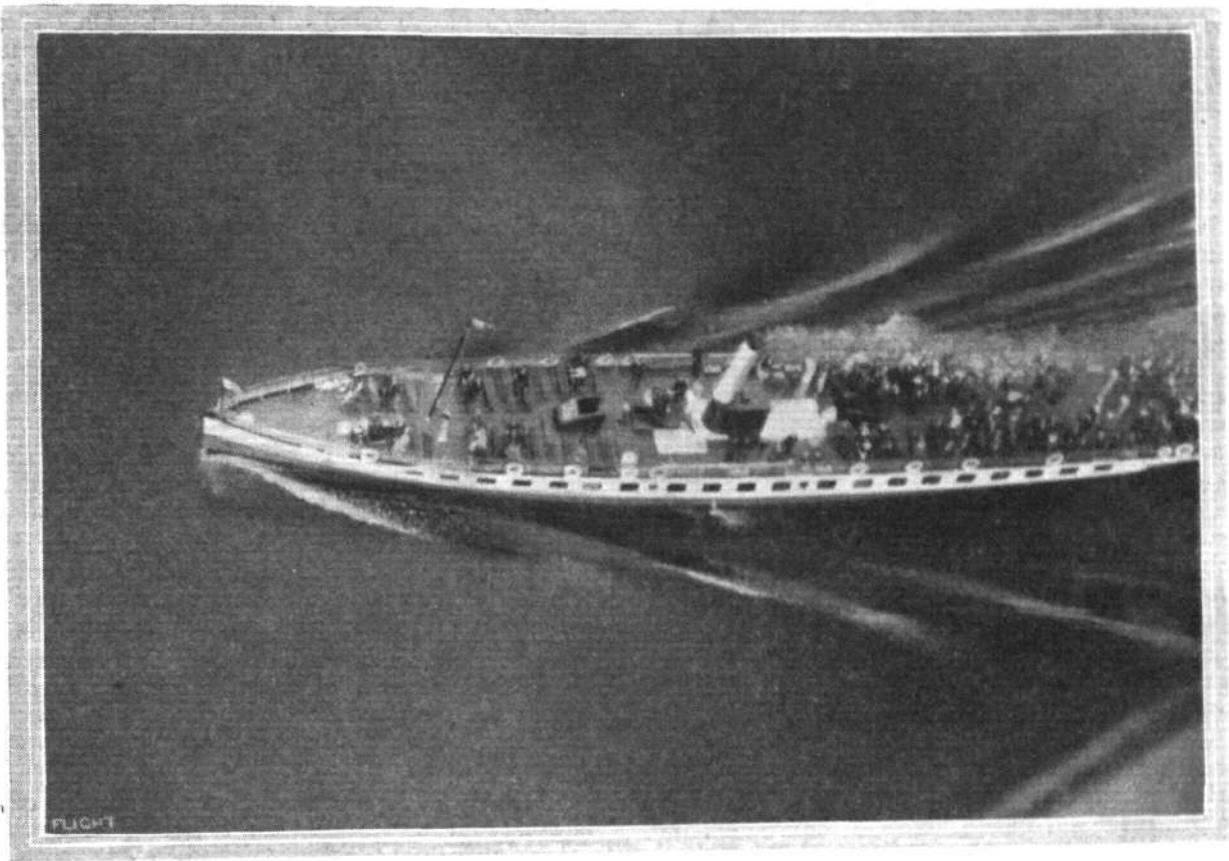
[Since the above was in type, and as we are closing for press, an article has appeared in our contemporary, the "Daily Telegraph," by Mr. Archibald Hurd, in connection with the "British Navy and its Work." The sentiments there expressed are so identical with our own that we reproduce Mr. Hurd's views on page 1157 without comment.—ED.]

\* \* \*

**Frightening the Germans!** The fogs, gales and floods recently experienced in Flanders temporarily acted as a hindrance to aerial work by either the Allies or the enemy. But with the coming of the frosts and the clearing of the atmosphere, our flying services have once again become active, as witness the splendid raid on the Zeppelin airship sheds at

NOVEMBER 27, 1914.

FLIGHT



A couple of views taken at Windermere from Mr. W. Rowland Ding's waterplane. The top photograph shows one of the passenger steamers crossing Lake Windermere, and the lower photograph is a near view of Bowness.

Friedrichshafen on Saturday last, by a trio of officers of the Royal Naval Air Service, official confirmation of which was issued by the Admiralty on Monday. The announcement, although brief, is instructive; it shews that Squadron-Commander E. F. Briggs, with Flight-Commander J. T. Babington and Flight-Lieutenant S. V. Sippe as pilots, flew from French soil 120 miles into German territory, and dropped bombs on the Zeppelin factory on the banks of Lake Constance. Flying low to make sure of their objective, they came under a heavy fire from guns, mitrailleuses, and rifles, and one of them, Commander Briggs, was wounded, brought to earth, and taken to the hospital as a prisoner. The other two officers returned in safety to France, though their machines were damaged by the German attack. They were satisfied that the bombs they had discharged had reached their mark, and that serious damage had been done to the Zeppelin factory.

The raid is a worthy successor to those that have already been made to Düsseldorf and Cologne, and should do much to instil in the minds of the German public the fact that the Allies are not as yet being held in a tight grip round Paris. As the Admiralty *communiqué* states, "this flight of 250 miles across mountainous country, in difficult weather conditions, constitutes with the attack a fine feat of arms" on which the three officers in particular and the Royal Naval Air Service as a body are to be heartily congratulated. It is gratifying to learn from the later report that the injuries sustained by Commander Briggs are not so serious as at first feared, and, although, naturally, he will be held as a prisoner of war, we trust he will speedily recover from the penalties of his daring exploit.

Precautions  
for Safety  
in Oversea  
Flight.

Time was, and that but a year or so ago, when an aeroplane flight across the Channel was regarded as a marvellous performance. Since then, however, the progress made in the aviation world has been so rapid that such flights have become, relatively speaking, an everyday occurrence, of which little or no notice is taken by the daily Press, or even by the general public. Unfortunately, although the number of accidents is very small in proportion to the numerous trans-Channel flights accomplished, all such attempts do not meet with success. Prior to the outbreak of the war, we had to bemoan the loss of several well-known aviators who lost their lives in the course of such a journey, while,

\* \* \*  
**THE AIR RAID ON ZEPPELIN FACTORY.**

THE Secretary of the Admiralty, through the Press Bureau, on Monday evening made the following announcement:—

"On Saturday a flight of aeroplanes,\* under the command of Squadron Commander E. F. Briggs, of the Royal Naval Air Service, with Flight Commander J. T. Babington and Flight Lieutenant S. V. Sippe as pilots, flew from French territory to the Zeppelin Airship Factory at Friedrichshafen.

"All three pilots in succession flew down to close range under a heavy fire from guns, mitrailleuses, and rifles,

\* 80 h.p. Gnome-Avros.—ED.

\* \* \*

**The Roll of Honour.**

THE following casualties in the Expeditionary Force were reported from General Headquarters under dates of November 3rd and 21st:—

since hostilities commenced, there have been additions to the death rôle in the same direction. Only a few days ago it was announced that Lord Annesley and Flight Lieut. C. F. Beevor had set out for a flight across the Straits of Dover, and as they never arrived at their destination and have not since been heard of, it is to be feared that their names must be added to the list of those who have given their lives in the work of the conquest of the air.

At a time when aircraft is rendering such valuable assistance to our naval and military forces in their operations against the enemy, we require the assistance of every possible flying officer, and it is in this connection that we suggest it is incumbent on the authorities to see that no machine is permitted to be flown over sea until it has been made capable of floating, at least for some reasonable period, in order to reduce the risk of loss of valuable life, by reason of the unexpected which *will* somehow always assert itself for preference under such circumstances. In this connection we may mention that, turning over the files of FLIGHT the other day, we find that in July, 1912, the Royal Aero Club of the United Kingdom adopted, on the recommendation of its Public Safety and Accidents Investigation Committee, after full consideration, a resolution to the effect "that aviators shall be prohibited from attempting flights over the sea, beyond the three-mile limit, unless suitable precautions have been taken to render their aircraft capable of flotation."

In spite of the present comparatively complete reliability of aeroplanes, not only are we strongly of opinion that the suggestion is one that should be rigidly still adhered to in all flying operations over the sea, but we furthermore consider that a regulation should be put into force forbidding any flying officer to set out on such a journey without being equipped with a life-saving jacket as well as with one of the swimming collars—which uninflated take up the room of about an ordinary tobacco pouch—now being served out to men serving on the vessels of the Navy. Great as has been the progress made in the field of mechanical flight, the risks associated with it are still such that no possible steps should be left untaken to reduce, especially at such a vital time as the present, to the lowest possible minimum the danger of such accidents, and, hence, we repeat that those in charge of our naval and military air services should see to it that everything is done, both as regards man and machine, prior to flights over sea being undertaken, which tends in this direction.

\* \* \*

**ZEPPELIN FACTORY.**

and launched their bombs according to instructions. Commander Briggs† is reported to have been shot down, wounded, and taken to hospital as a prisoner. Both the other officers have returned safely to French territory, though their machines were damaged by gun fire. They report positively that all bombs reached their objective, and that serious damage was done to the Zeppelin factory.

"This flight of 250 miles, which penetrated 120 miles into Germany, across mountainous country, in difficult weather conditions, constitutes with the attack a fine feat of arms."

† Avro. No. 874.—ED.

\* \* \*

**Wounded.**

Read, Lieut. W. R., 1st (King's) Dragoon Guards and Royal Flying Corps.

Paterson, Second Lieut. R. O., Royal Flying Corps.

## SOME GERMAN ANTI-AIRCRAFT GUNS AND THEIR AMMUNITION.

THE introduction of airships and aeroplanes into the various armies has naturally had its effect on the design of guns, or, more correctly, it has brought about the evolution of special types of guns suitable for the particular conditions obtaining in aerial warfare. That the ordinary ordnance was only suitable for attack on aircraft under certain exceptional conditions will be easily appreciated when it is remembered that the airship or aeroplane presents a rapidly moving target, the range of which is not readily found since it is not in the same plane as the gun, but elevated a certain number of degrees ranging from 0 to 90° above it. Rifle fire and machine gun fire are lacking in range, effectiveness and facility for observing the path of the projectile, whilst field guns do not possess sufficient elevation to allow of their being

trained on aircraft, nor, were they once trained on their quarry, would they be able to follow it.

What then are the requirements to be fulfilled by the anti-aircraft gun? In the first place the gun, to be suitable for dealing with aircraft, must be capable of great elevation, at least up to 70°, and it must have the greatest possible traverse, that is to say, it should be capable of firing in any lateral direction; not only so but the pivoting mechanism should be so designed that the gun may be rotated quickly enough to follow the movement of the aircraft. A quick rate of firing is another essential point that has received attention from the designers of anti-aircraft guns.

Of the German firms who have produced these new types of guns, the most important are the Krupp's of

### KRUPP ANTI-AIRCRAFT GUNS.

	2.94-in. Field Gun, Swivelling Wheels.	2.8-in. Gun on Motor Car.	2.94-in. Naval Gun with Shield.	3.46-in. Naval Gun without Shield.	3.46-in. Naval Gun with Shield.	4.1-in. Coast Gun with Shield.	4.73-in. Coast Gun with Shield.
Length of barrel ... ... ... cal.	30	30	45	35	45	45	45
Weight, ready for firing ... ... ... lbs.	2,260	2,700	9,600	7,620	12,800	12,000	18,800
Weight of carriage ... ... ... lbs.	3,750	—	—	—	—	—	—
Weight of shield ... ... ... lbs.	—	—	2,070	—	5,300	1,720	2,370
Thickness of shield ... ... ... ins.	—	—	47	—	2/47	47	47
Arc of elevation ... ... ... degrees	+65-5	+75±0	+70-10	+80-10	+60-10	+60-10	+60-10
Traverse ... ... ... degrees	360	360	360	360	360	360	360
Rate of firing ... ... ... shots per min.	—	—	25-30	20-25	20-25	15	10
Weight of projectile ... ... ... lbs.	14.3	11	12.8	21	21	34	53
Muzzle velocity ... ... ... ft./sec.	1,680	2,140	2,630	2,070	2,630	2,630	2,630

### ANTI-AIRCRAFT GUNS OF THE METALLWAREN- UND MASCHINENFABRIK.

	1.96-in. Gun on Armoured Motor.	1.96-in. Gun on Semi-armoured Motor.	2.56-in. Gun on Motor.	2.95-in. Gun on Semi-armoured Motor.	4.15-in. Gun on Special Carriage.	2.95-in. Field Gun.
Length of barrel ... ... ... ft.	5	5	7.7	7.4	12.1	7.9
Weight of barrel ... ... ... lbs.	310	310	790	680	2,750	750
Arc of elevation ... ... ... degrees	+70-5	+70-5	+75-5	+70-5	+70-5	+70-5
Traverse ... ... ... degrees	60	360	360	360	360	360
Thickness of armour ... ... ... ins.	1/8	1/8	—	1/8	1/8	1/8
Weight of armour ... ... ... lbs.	1,200	550	—	1,180	1,320	132
Weight complete† ... ... ... lbs.	6,800	6,150	13,200	13,500	13,000	2,480
<b>Ammunition.</b>						
Weight of charge ... ... ... lbs.	375	375	1.65	1.32	4.4	1.54
Weight of projectile ... ... ... lbs.	5.6	5.6	9	14.3	37.5	14.3
<i>a. Shrapnel.</i>						
Number of bullets ... ... ...	92	92	150	265	625	265
Weight of bullets (each) ... ... ... lbs.	.0176	.0176	.0199	.0199	.024	.0199
Weight of base charge ... ... ... lbs.	.066	.066	.088	.154	.495	.154
Weight of grenade charge ... ... ... lbs.	.176	.176	.35	.505	.138	.505
<i>b. Smoke shrapnel.</i>						
Number of bullets ... ... ...	100	100	170	280	645	280
Weight of bullets (each) ... ... ... lbs.	.0176	.0176	.0199	.0199	.024	.0199
Weight of base charge ... ... ... lbs.	.066	.066	.088	.154	.495	.154
<i>c. Grenades.</i>						
Weight of charge ... ... ... lbs.	374	374	615	1.01	3.3	1.01
Weight of shell ... ... ... lbs.	3.7	3.7	5.2	10	26.2	10
Initial velocity ... ... ... ft./secs.	1,480	1,480	2,200	1,640	1,990	1,805
Muzzle energy ... ... ... ft./tons	80	80	301	268	1,020	322
Max. range at 43° elev. ... ... ... ft.	25,600	25,600	33,000	30,000	39,000	32,000
Max. height at max. elev. ... ... ... ft.	12,200	12,200	26,000	19,200	27,300	22,300
Range at max. elevation ... ... ... ft.	12,500	12,500	19,000	21,700	28,500	23,500

+ With ammunition and full equipment.

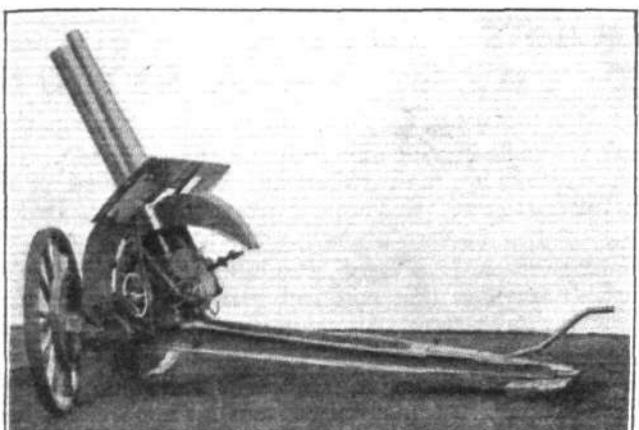


Fig. 1.—3-in. Krupp anti-aircraft field gun, L/30, with swivelling wheels.

Essen and the Rheinischen Metallwaren- und Maschinenfabrik of Düsseldorf. As the Krupp is the best known of these two, the products of this firm will be dealt with first. The Krupp anti-aircraft guns may be divided into three general types, each designed for a special purpose.

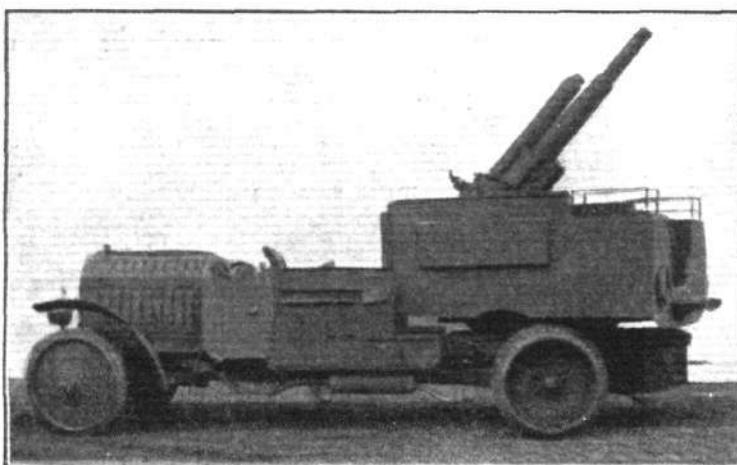


Fig. 2.—2.8-in. Krupp anti-aircraft gun, L/30, mounted on motor car. On the right, a 1.96-in. quick-firing anti-aircraft gun mounted on an armoured motor car. The gun on the right is made by the Rheinischen Metallwaren- und Maschinenfabrik, Düsseldorf.

The sighting arrangements, needless to say, are of the most up-to-date design, there being a sighting telescope and a general finder with a wider field. A quick rate of firing is obtained by automatic opening and closing of the breech, and advantage has been taken of all the latest developments, such as hydraulic recoil buffers, spring for returning the gun to firing position, &c. Beginning with the smallest type, there is the comparatively light gun designed for use in the field and mounted on a light two-wheeled carriage. The wheels of this are so pivoted as to allow each one to swing around separately until its diameter is placed tangentially to a circle having as its centre a pin at the end of the tail of the carriage. A glance at the accompanying illustration (Fig. 1), will explain this point much better than a lengthy description. When the wheels have been swung round into this position the gun, it will be seen, may be rotated round the pin in the tail and thus quickly pointed in any desired direction.

The calibre of the field gun is about 3 ins., or, to be exact, 2.94 ins., and it fires a shell weighing 14.3 lbs.

The next type is the gun designed to be carried on a motor car (Fig. 2). This gun is mounted on a central pivot similar to those used for naval guns, and fires a projectile weighing 11 lbs. The calibre—2.8 ins.—is

slightly smaller than that of the field gun, and the maximum elevation is 75° as against 65° in the case of the latter. Elevation and depression is obtained by means of a double-toothed sector driven by a pinion and crank. For the horizontal rotation of this gun a special mechanism is fitted which allows of quickly revolving the gun to approximately the desired position, finer adjustment being obtained by a slower revolving arrangement. Usually the gun is mounted on a motor car of 50 h.p., and capable of a speed of 30 m.p.h. The weight of the car without the gun is 10,200 lbs., and with the gun 12,900 lbs. With full equipment, including a crew of six, the total weight is 15,700 lbs. As both axles are driving axles it is possible for this car to travel over very bad ground, and it is stated to be capable of climbing gradients up to 1 in 5, although only fitted with a 50 h.p. engine. The equipment includes, of course, the necessary ammunition and all spares and tools that are likely to be wanted.

The third type of anti-aircraft gun turned out by the Krupp firm is designed for use on board ship and for coast defence, and is made much heavier than the previously described types, as weight is not of such great



importance. Three naval guns of varying size are made for fighting aircraft. One is a 3 in. (approximately) gun, firing a projectile weighing 12.8 lbs., whilst the second has a calibre of 3.46 ins. and fires a shell weighing 21 lbs.

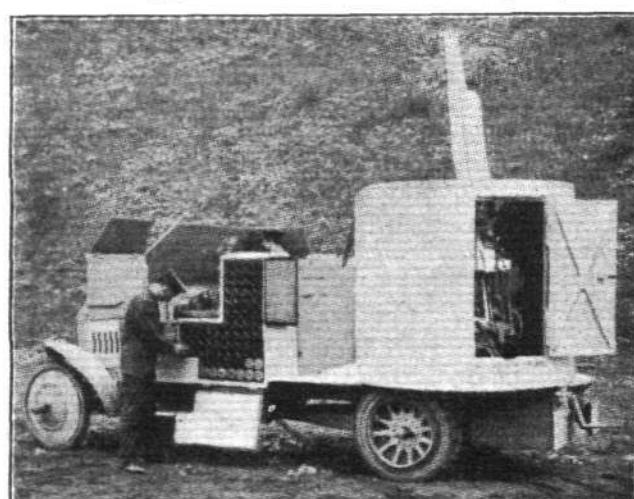


Fig. 3.—2.8-in. Krupp anti-aircraft gun, L/30, mounted on armoured motor car.

The third is of the same calibre, and fires a shell of the same weight, but has a slightly longer barrel and is considerably heavier, being fitted with a shield for the protection of the gun crew. Of the coast gun type two sizes are manufactured, one of 4·1 ins. calibre (Fig. 5), and the other of 4·73 ins. The former fires a 34 lbs. shell, whilst the latter fires one weighing 53 lbs. The naval guns all have a depression of  $10^{\circ}$ , and their elevation ranges from  $60^{\circ}$  to  $80^{\circ}$ . Both the coast defence guns have an elevation of  $60^{\circ}$  and a depression of  $10^{\circ}$ .

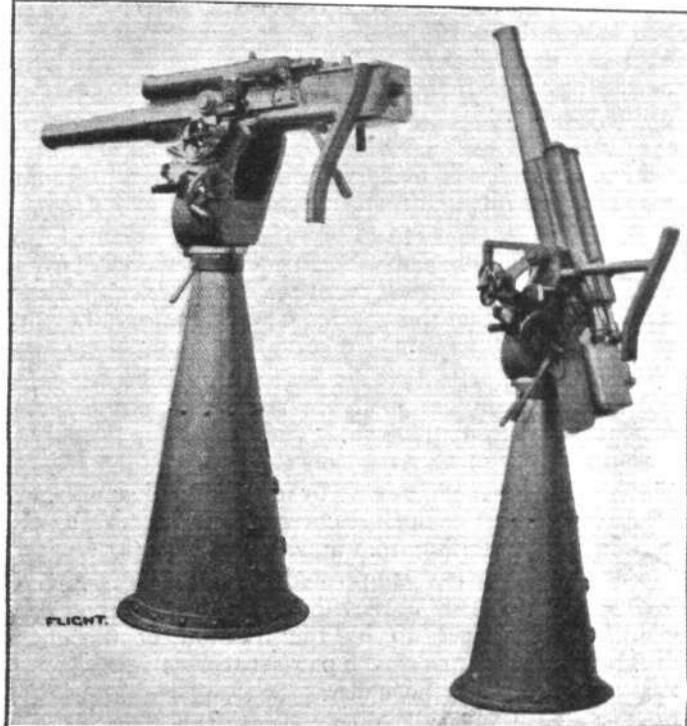


Fig. 4.—Two views of 1·96-in. quick-firing anti-aircraft gun constructed by the Rheinischen Metallwaren- und Maschinenfabrik, showing horizontal and maximum elevation.

The rapid development of aircraft during the last few years has not only produced a special type of gun but also special ammunition, as the purpose for which these guns are used necessitates other qualities than those possessed by the ordinary type of shell. Most successful of these is probably the Krupp incendiary shell, which on striking ignites the gas of the dirigible, thus causing

up by the rotation of the shell causes knives to be hurled out which tear the envelope of the dirigible. In addition to these a percussion fuse explodes a charge in the nose of the shell, which on detonating causes further damage.

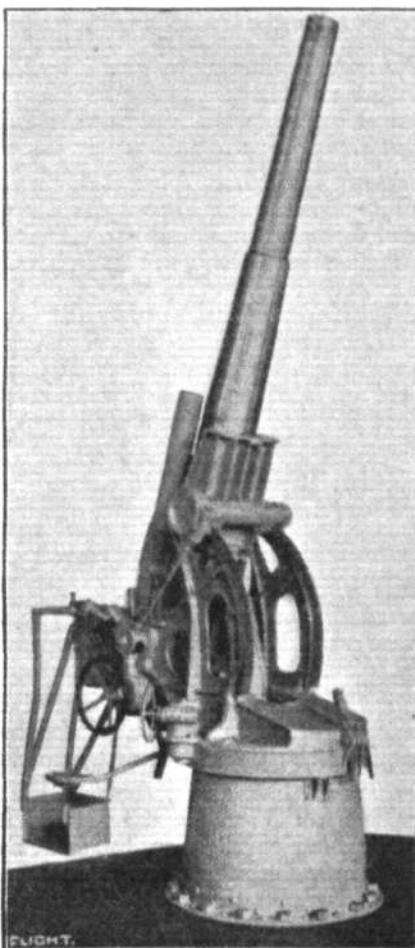


Fig. 5.—4·1-in. Krupp anti-aircraft gun on naval mounting.

In the Hartbaum shell ignition is by means of a small spherical fuse of Platinum Sponge, and this shell also contains an explosive charge and a reservoir with compressed oxygen which, on being mixed with the gas

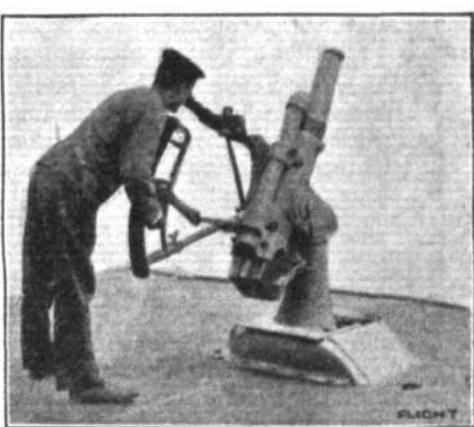
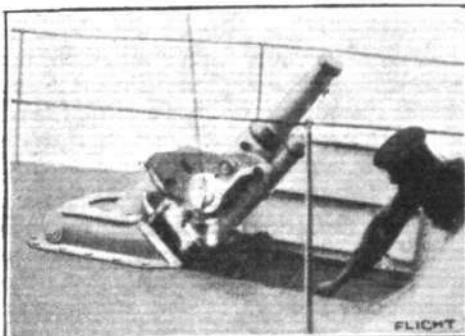
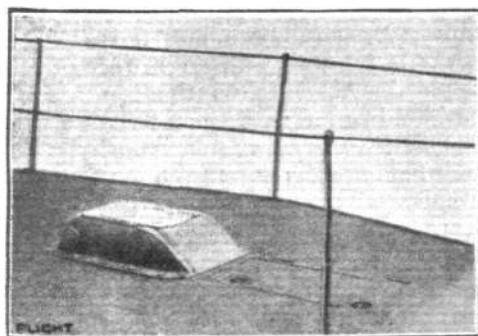


Fig. 6.—Three photographs, showing disappearing anti-aircraft gun on a German warship.

it to explode. The shells made by Lenz of Gross-Lichterfelde, by Ehrhardt of Düsseldorf, and by Hartbaum of Essen, depend on another principle. In the shells made by the two former, the centrifugal force set

(hydrogen) in the airship, forms a highly explosive mixture.

The Cologne gunpowder factory is said to have brought out an anti-aircraft shell which possesses the

advantage that, should it miss its target it will not explode and thus cause damage to friendly troops on striking the ground. As, however, the Krupp shells are the most successful, a fuller description of one of these may be given in order that an idea may be obtained of what our aviators at the front have to contend with.

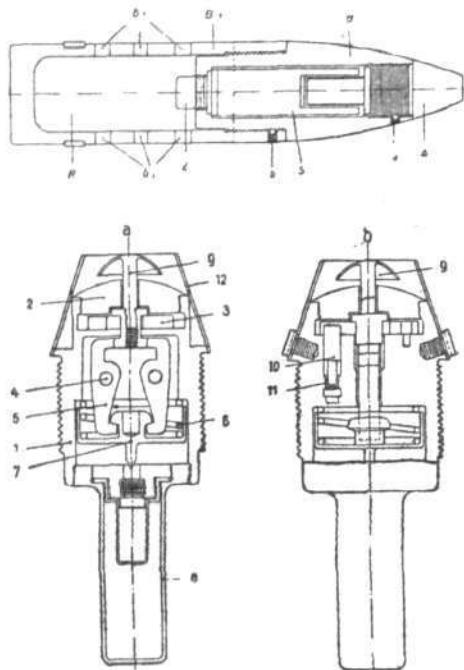


Fig. 7.—The anti-aircraft shell manufactured by the Krupp firm of Essen.

The Krupp shell (Fig. 7) is divided into two parts. The front portion, B, which has very thick walls, is screwed into the rear part, B<sub>1</sub>, which has comparatively thin walls, and is locked in position by means of the set screw, b. The internal hollow spaces of the two parts of the shell are separated by the thick floor of the front part. The small space in front is fitted at the top with a screw thread for the reception of the percussion cap, A, which is held in position by the set screw, a. Contained in the hollow space below the percussion cap is the explosive charge, S. The large hollow space in the rear portion of the shell is filled with the smoke producing material which gives out a thick easily visible smoke, but does not develop any high pressure gases which might adversely affect the path of the shell. The flames produced are allowed to escape through the openings, b<sub>1</sub>.

Ignition of the smoke charge is effected by the igniter, L. When the shell is fired, the shock causes the detonator, which is ordinarily kept from contact with the striking needle by means of a spring, to fly back on to the needle, and the heat thereby generated causes a small flame, which is led through small openings to the smoke charge in the rear of the shell. The smoke of this charge is, as we have already pointed out, allowed to escape through the openings, b<sub>1</sub>, and forms an easily visible trail behind the shell, the path of which may thus be followed by the gun crew. The smoke charge is placed behind the explosive charge in order to keep the centre of gravity of the shell sufficiently far forward to ensure a good flight path.

The fuse must be exceedingly sensitive in order to operate on the slight shock caused by the shell hitting the envelope of an airship, and at the same time it must not be brought into action by the rotation of the shell or by the air resistance.

The percussion fuse consists of a main body, 1,

which receives all the other parts. In the upper part are situated the bearers for the check pieces, 3, and the screw thread which receives the fuse cover, 2. In the lower part is the cavity for the two pawls, 5, the passage for the needle piece, 7, and a screw thread for the reception of the case containing the detonating charge, 8. Two horizontal passages take the pivots, 4, and a vertical passage accommodates the check pin, 10. The fuse cover, 2, serves as a guide for the cap, 9, and closes the top of the fuse. The five check pieces, 3, are made of brass and pivot round pins secured in the main body of the fuse. The two steel pawls, 5, are held on the two bolts, 4, and rest their upper ends on the hammer and their lower ends grip the needle piece, holding it in position against the action of the spring, 6. The case, 8, contains the ignition cap, the explosion cap, and the ignition charge. The hammer, 9, which is made of aluminium, is mushroom shaped at the top, and carries a collar with two flanges. The check pin, 10, is forced upwards by the action of the spring, 11, and prevents the first check piece, a, from swinging outwards during transport. The check pieces are so arranged that the centrifugal force caused by the rotation of the shell causes them to swing outwards one by one, thus insuring that the fuse shall not be brought into action until the shell has reached a point some distance away from the gun. The hammer is locked in position by the upper flange on the collar, which is prevented from moving upwards by engaging in a circular recess in the base of the fuse cover, and the check pieces, 3, prevent the hammer from moving downwards.

The two steel pawls are pivoted round the bolts, 4, and lower arms are made heavier than the upper ones. The centrifugal force set up by the rotation of the shell causes the upper arms of the pawls to press inwards on the lower flange of the collar. The coil spring presses the flange on the needle piece against the claws of the lower arms of the pawls. The friction of the upper arms of the pawls against the upper flange of the collar, and the pressure of the coil spring is, however, only just sufficient to prevent the hammer from being forced back by the air resistance on the nose of the shell, and thus prevents a premature firing of the shell while passing through the air.

When the shell is fired the check pin, 10, overcomes, on account of its inertia, the action of the check spring, 11, and by moving back allows the check piece, a, to swing outwards on account of the centrifugal force. The withdrawal of the check pin has released the first check piece, a. The second check piece, b, is kept in its place until the check piece, a, has swung fully out, and it is not until then that the next is released, and so on for the whole set of check pins. As soon as the last check piece has swung out the hammer is free and the percussion fuse ready for action.

When the shell strikes the hammer is forced back and the lower flange of the collar no longer prevents the upper arms of the pawls from moving inwards, or, in other words, the lower arms of the pawls from swinging outwards, which they do on account of the centrifugal force. In moving outwards the claws on the lower arms of the pawls release the needle piece which is then forced by the spring down against the percussion cap, thus starting the explosion.

A certain amount of danger exists of course in case the shell misses the airship, as it will explode on returning to the ground, but as the charge is comparatively small the damage done is in most cases inconsiderable.

## AN "INDUSTRIAL ARMY" BADGE FOR KING AND COUNTRY.

THE following is the text of Mr. Archibald Hurd's article, referred to on page 1150:—

### "Our Increasing Forces.

"What is the position? We have a vast fleet, larger than any fleet ever seen before, for which Parliament has voted 216,000 officers and men; we are building up an army of over 2,000,000 men. If every able-bodied man, as has been suggested, enlists in the Army, how will all the wants of the fighting men afloat and ashore be supplied? The Navy requires constant supplies of food, clothes of all descriptions, coal, oil, ammunition, and a hundred and one things which are essential to its efficiency. Mr. Churchill reminded us the other day of 'the enormous impending influx of capital ships, the score of 30-knot cruisers, the destroyers and submarines unequalled in modern construction.' The new army must be furnished with all it needs in the way of guns and general equipment. We have in normal times in this country a military establishment of about a quarter of a million first-line troops, and we are now expanding it as rapidly as possible to 2,000,000—multiplying it by eight.

"The food and clothes of our vast Navy and our huge Army will not fall like manna from the skies; ships—whether they be Dreadnoughts, cruisers, destroyers, or submarines—will not spring up in a night like mushrooms; the big guns of the sea and land forces will not grow on trees like figs, nor can ammunition in unprecedented quantities be plucked from our hedgerows.

### "Essential Industries.

"A score of industries are engaged in reinforcing our sea-power; another score of industries are employed in expanding our military power. This process will continue at the highest pressure for many months, and with every day that passes the labour problem will increase, because as we complete new ships and finish training new armies and enter recruits for further corps, the demands for supplies will grow, until we shall be in a position of great embarrassment—unless a suitable remedy be applied.

"The point which must be made clear is that the fighting which has to be done must be done in shipyard, factory, and workshop, as well as in the North Sea and on the battlefields of the Continent. Those who fight industrially, working long hours in a spirit of high patriotism, may not seem very heroic, and that is all the more reason why we should be careful not to tempt them from their jobs, either by appeals to go to the front or by heaping contumely on them.

"But it may be said that all this work—which includes, by the way, all that the Belgian army requires—might be done by men over military age. No one who has ever visited a shipyard, armour

factory, or gun-making establishment, who has seen all the various intricate machines in other workshops, busy with Navy or Army orders, would advance such an argument. These places require men in the fulness of their vigour, and the Government should take steps to make it known far and wide that they are regarded as combatants, since they belong to the industrial army which is supporting the other armies on shipboard and on land.

### "A Button with a Purpose.

"In France, where they understand the problem, a button is issued to all such workers. We should have a button which should be a certificate that, though these artisans and others are not dressed in blue serge or in khaki, they are engaged in war services. Some such distinctive badge ought to be introduced, and be issued to everyone of military age who cannot be spared to shoulder a rifle, whether he be engaged in an essential industry which is supporting the Navy and Army in efficiency, be employed on board fleet auxiliaries or transports, or be attached to one of the great railway systems. All these men are the necessary auxiliaries of our fighting strength, and if they fail the Navy cannot do its work, and the Army, however large it be, may as well not exist, for an army moves on its stomach.

"Already not a little mischief has been done in the trades which are engaged in building, arming, armouring, and generally equipping the new ships of which the First Lord has spoken. There can never, in times like these, be a surplage of skilled labour, but a positive shortage will arise unless men who are fighting their country's battles in the way for which their training fits them, are preserved from exchanging their implements for a rifle in deference to a misinformed public opinion.

"No excuse is, of course, offered for the slacker; he ought to be forced by law, or public opinion, to render his service in this emergency. But let us recognise that vital work in this war is being done by thousands of men who will never go on board any of our men-of-war or have the satisfaction of firing on the Germans in their trenches.

"It must be our aim to profit in a way that the Germans cannot do. The Germans are hard pressed. We are keeping from them what they want in the way of material to make good the wastage of war. The enemy is using up his resources from day to day at a prodigious rate, and he cannot replace them, while we are drawing on the seas for all we require for our new armies and our civil population. Germany's list of contraband and conditional contraband goods is really a 'scrap of paper,' because all our ports remain open. She, on the other hand, has no merchant ships and no ports free from what amounts almost to a blockade. If we are to reap the full harvest of our sea power, we must protect the essential members of the industrial army."



## AT THE FRONT.

weather, for winter has now set in in earnest. A miserable afternoon of snow and slush has been succeeded by a night of frost, and this morning is keen, calm, and bright, and promises well for the aviators, who have recently been so much hampered in their work."

In the collection of extracts from the diaries of German soldiers sent by "Eyewitness," under date of November 21st, were the following:—

"From a letter of a gunner of the Field Artillery:—

"October 21st, 1914. No. 11.

"On September 26th a French aviator dropped a bomb on Cambrai, killing four Landwehr men and tearing off the arm of the Paymaster."

"From a letter of a man of the 242nd Reserve Regiment of the same corps:—

"The shooting of the English artillery is marvellous. They get the right range and direction every shot, and place each shell within a yard of the previous one. They must be wonderfully well informed of our movements. I don't know whether the intelligence is obtained by their aeroplanes, which are always hovering over us, or whether they have telephones behind our lines."

THERE were the following references to the work of aircraft in the descriptive account communicated by an "Eyewitness" present with the British headquarters, dated November 16th and published by the Press Bureau on the 19th inst.:—

"For the last ten days the weather has been much against aerial reconnaissances. It has either been so misty that nothing can be seen or so windy as to interfere with flying. There has also been a good deal of rain, which has added to the discomforts of active service. . . .

"The weather on this day (Sunday 15th) was about the worst we have yet experienced. It was bitterly cold, and rain fell in torrents. Nevertheless, in spite of all difficulties, our aviators carried out a successful reconnaissance. For some time they hovered over the German lines, observing the emplacements of batteries and searching the roads for hostile columns in the midst of a storm of driving snow and sleet which was encountered at high altitudes."

In a supplementary despatch, dated November 20th and issued by the Press Bureau on the 22nd, there was the following:—

"The great change that has occurred has been in the



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Aviators' Certificates.

THE following Aviators' Certificates have been granted:—

970 Flight Sub-Lieut. Douglas Iron, R.N.A.S. (E.A.C. Biplane, Eastbourne School, Eastbourne). Oct. 28th, 1914.

971 2nd Lieut. John Eustace Arthur Baldwin (8th Hussars) (Maurice Farman Biplane, Netheravon School, Netheravon). Nov. 17th, 1914.

972 2nd Lieut. Erik Harrison Mitchell (Maurice Farman Biplane, Netheravon School, Netheravon). Nov. 17th, 1914.

973 Francisco Carabajal (Grahame-White Biplane, Grahame-White School, Hendon). Nov. 18th, 1914.

974 Capt. Gerald William Huntbach (4th King's Shropshire Light Infantry) (Maurice Farman Biplane, Netheravon School, Netheravon). Nov. 18th, 1914.

975 Lieut. Alan John Lance Scott (Sussex Yeomanry) (Maurice Farman Biplane, Netheravon School, Netheravon). Nov. 20th, 1914.

## Air Attack on Friedrichshafen.

Members will be gratified to learn that the three Naval aviators, viz., Squadron Commander E. F. Briggs, R.N.A.S., Flight Lieut. J. T. Babington, R.N.A.S., and Flight Lieut. S. V. Sippe, R.N.A.S., who made the attack by air on the Zeppelin Airship Factory at Friedrichshafen on the 21st inst., are Members of the Club.

## Royal Aero Club Burgee.

Burgees, embodying the design recently approved by His Majesty the King, namely the Royal Crown with the Caduceus, can now be obtained by Members from the Royal Aero Club, price 6s. each.

## New Members.

Members are reminded that according to the Rules, the Annual Subscription of any New Member they may propose, who is elected between November 1st and December 31st of this year, will cover the period up to December 31st, 1915.

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

## THE BRITISH AIR SERVICES.

## Royal Naval Air Service.

THE following were announced by the Admiralty on the 19th inst.:—

The following have been entered as probationary Flight Sub-Lieutenants, and appointed to the "Pembroke III," for Royal Naval Air Service, to date as mentioned: A. Q. Cooper (temporary service), Nov. 14th. L. P. Openshaw and C. E. Brisley, Nov. 16th. W. H. Wood, Nov. 11th. F. J. Bailey, Nov. 12th. F. W. Gamwell and R. D. G. Sibley, Nov. 16th. E. Parker, Nov. 14th.

The following was announced by the Admiralty on the 20th inst.: Mr. R. B. Pullin has been entered as probationary Flight Sub-Lieutenant and appointed to the "Pembroke III" for Royal Naval Air Service. To date Nov. 12th.

The following were announced by the Admiralty on the 21st inst.: Thomas V. Lister and Thomas F. N. Garrard have been entered as Probationary Flight Sub-Lieutenants, and appointed to the "Pembroke III," for R.N. Air Service. Nov. 20th.

The following were announced by the Admiralty on the 23rd inst.: Probationary Flight Sub-Lieutenants.—The undermentioned officers have been confirmed in the rank of Flight Sub-Lieutenants, and appointed as follows: B. C. Meates, with seniority of Aug. 14th, and T. H. England, with seniority of Sept. 12th, both to the "Pembroke III," for R.N. Air Service. Nov. 18th.

The undermentioned probationary Flight Sub-Lieutenants (for temporary service) have been confirmed in the rank of Temporary

Flight Lieutenants, with seniority as follows: R. P. Cannon and E. R. Moon, Sept. 11th; A. K. Robertson and R. E. Penny, Sept. 30th; E. H. Dunning, Oct. 4th, and all appointed to the "Pembroke III," for R.N. Air Service. To date Nov. 18th.

William G. Moore and Cyril N. Leeston-Smith have been entered as Probationary Flight Sub-Lieutenants, with seniority of Nov. 16th and 19th respectively.

George H. Reid entered as Probationary Flight Sub-Lieutenant, for temporary service, with seniority of Nov. 19th.

The following were announced by the Admiralty on the 24th inst.:—

Edward T. A. Chave and Thomas Hinshelwood have been entered as Probationary Flight Sub-Lieutenants, and appointed to the "Pembroke III," additional, for Royal Naval Air Service. November 23rd.

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 19th inst.:—

Supplementary to Regular Corps.—The undermentioned to be Second Lieutenants (on probation): Percy Russell Grace. Dated Nov. 12th, 1914. Malcolm Grahame Christie. Dated Nov. 20th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 23rd inst.:—

Supplementary to Regular Corps.—Sec. Lieut. Arthur V. Bettington is confirmed in his rank.

## ENEMY PATENTS RELATING TO AERONAUTICS.

LIST of British patents, which have been granted in favour of residents of Germany, Austria, or Hungary, specially compiled for FLIGHT, by Lewis Wm. Goold, Chartered Patent Agent, Euroled Patent Attorney in the United States, 5, Corporation Street, Birmingham, who will supply full copies of any of the patents, price 8d. each, and from whom the latest particulars upon the Register of Patents can be obtained.

Furnished in view of the new Patents Acts which empower the Board of Trade to confer upon British subjects the right to manufacture under enemy patents.

No. 11948/08. Apparatus for propelling aerial machines or aerostats by means of valved planes, moving along horizontal straight paths. Wisniewskie, V., Berlin. Dated December 9th, 1907.

No. 25749/10. Flying machine provided with lifting screw propeller. Mees, G., Berlin. Dated November 22nd, 1909.

No. 886/11. Aerostats of the rigid type are constructed with a framework having as many tensile elements as possible. Stuhler, M., Germany. Dated January 17th, 1910.

No. 1551/11. Balloons for airships. Roth, E., Germany.

No. 1629/11. Valved propelling blades. Wisniewskie, V., Berlin. (Addition to 11948/08).

No. 1711/11. Propelling; balancing automatically. Rath, P., Austria.

No. 1784/11. Planes, construction of; cars. Junkers, H., Germany. Dated January 29th, 1910.

No. 2041/11. Propelling, steering, and balancing. Mees, G., Germany. Dated February 1st, 1910.

No. 2636/11. Aerial machines, with aerostats; military apparatus; cars. Wankmuller, P., Berlin.

No. 2904/11. Aerial machines without aerostats; cars; starting; steering and balancing; tanks, arrangement of. Mees, G., Germany. Dated February 15th, 1910.

No. 2978/11. Parachutes. Maraviglia, J., and Banzet, H., Germany.

No. 3882/11. Balancing; propelling; shock of landing, deadening. Mees, G., Germany. Dated March 5th, 1910. (Addition to 25749/10).

Fatal Accident on Salisbury Plain.

WHILE flying near Upavon, on Salisbury Plain, on Tuesday, Second Lieut. H. R. Fleming, of the Royal Flying Corps, met with an accident, and received injuries which terminated fatally.

Evidence given at the inquest on the following day showed that the machine dived almost vertically from 1,200 ft. up, turned on its back, glided a short distance, and then dived to the ground. A verdict of "accidental death" was returned.

1158

## THE 80 H.P. BRITISH-BUILT GNOME ENGINE.

THE completion of the first 80 h.p. Gnome engine at the works of the Daimler Co. at Coventry marked a fresh stage of aeronautical engine development in this country, and the expedition with which the work was carried

to manufacture the 80 h.p. Gnome engine on August 7th last there were no detail working drawings or specifications of material available. Instead of delaying the work until such time as drawings could be obtained from Paris,

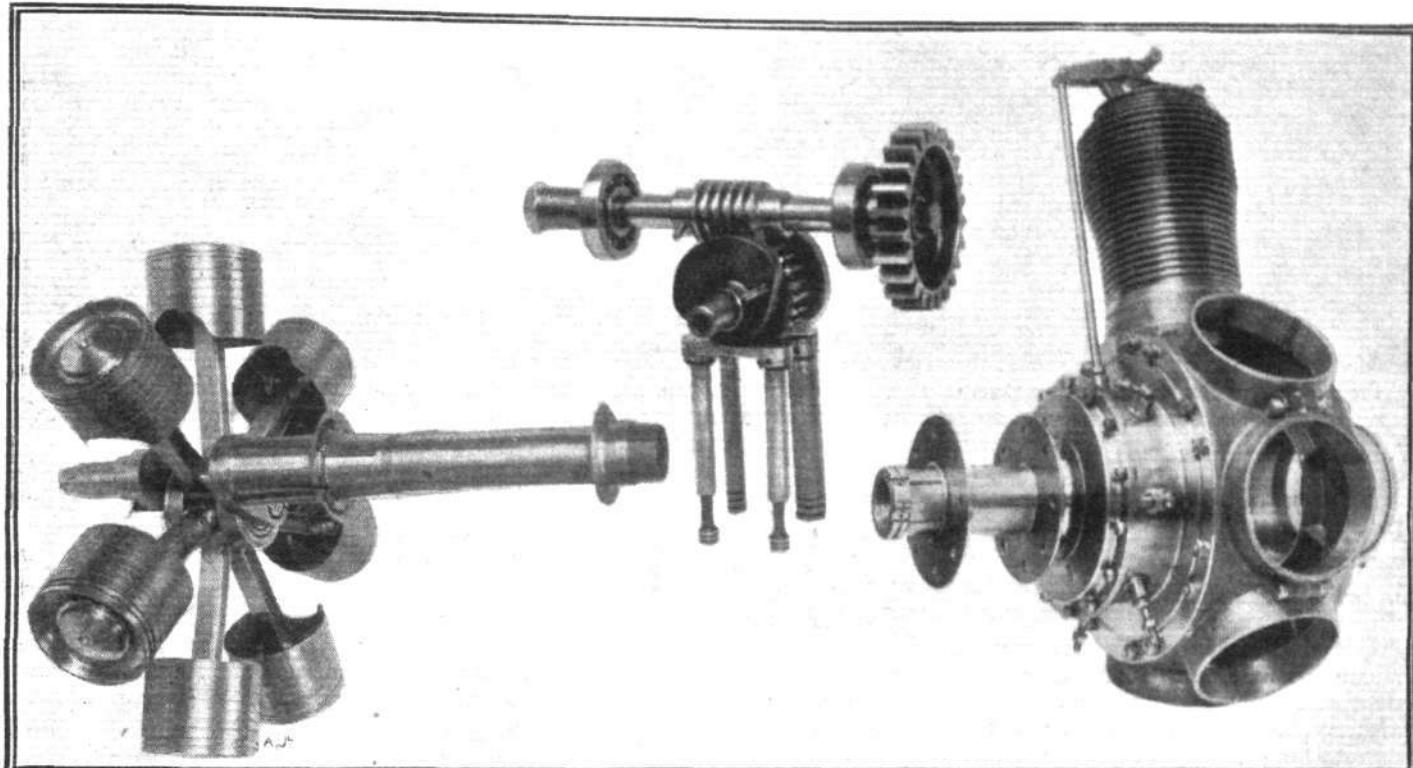


Fig. 1.—The 80 h.p. Daimler-Gnome Engine.—On the left is a view showing the pistons, connecting rods and crank-shaft assembled. On the right is shown the crankcase, complete with valve gear case, nose piece and propeller boss, and one cylinder in place. In the centre the internal mechanism of the lubricating pumps is shown.

through affords added proof of the enormous resources of the firm to which it was entrusted. An opportunity, at the invitation of the Gnome Engine Co., to visit the works of the Daimler Co. in order to see the engines

an engine was sent down to the works on that date and the work of preparing a new set of drawings from actual measurements was immediately commenced. These were completed in seven days, no less than 300 drawings

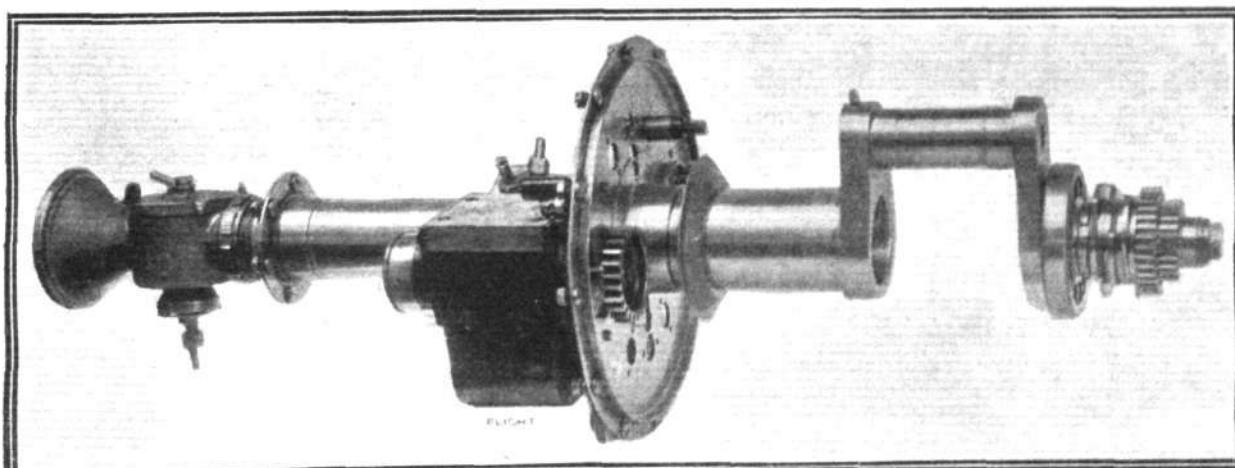


Fig. 2.—The 80 h.p. Daimler-Gnome Engine.—A view of the complete stationary crankshaft, with the rear end plate upon which the oil pump, magneto and distributor brush are seen mounted.

in course of construction and under test, was therefore gladly taken advantage of.

In connection with the construction of this British-built Gnome engine, it may be pointed out that when the Daimler Co. accepted the invitation of Mr. Holt Thomas

being necessary; meanwhile a specification list had been compiled and issued to the various departments, material had been ordered, dies for over 16 stampings and jigs, tools and gauges had been put in hand. An endeavour was made to complete the first engine within eight weeks

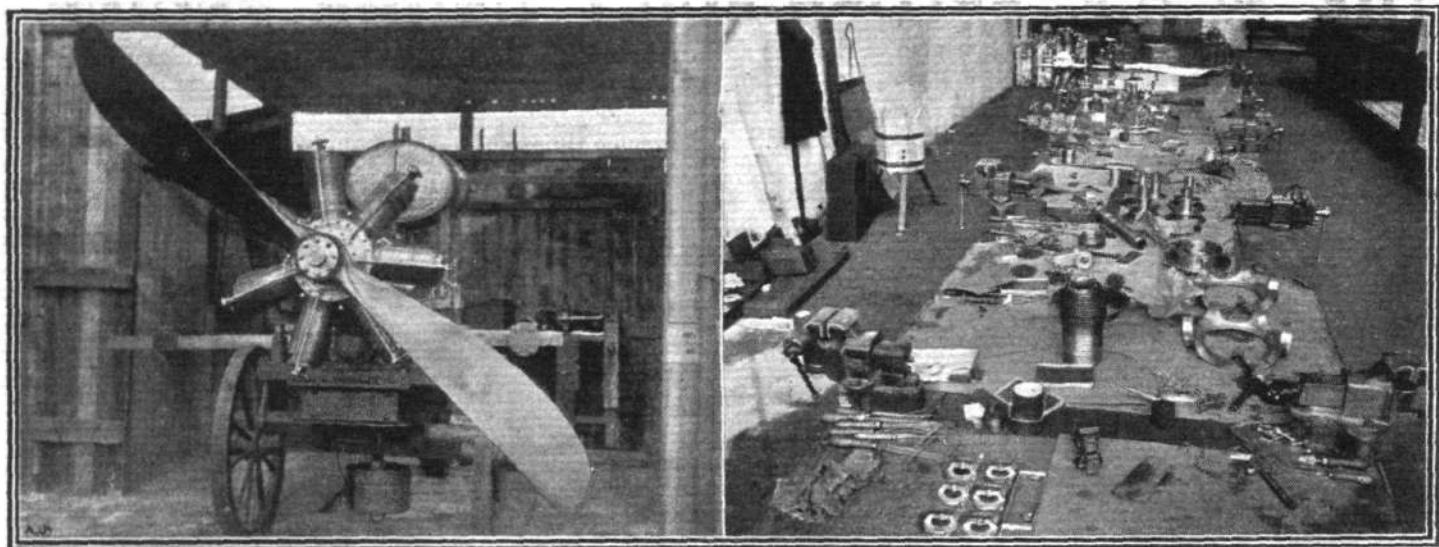


Fig. 3.—The 80 h.p. Daimler-Gnome Engine.—On the left an engine is seen mounted on the testing bed, whilst on the right is a view of an erecting bench showing the engine parts laid out ready for assembling.

of the acceptance of the order, and notwithstanding the difficulties this was successfully achieved, the engine being run on the test bed on the Wednesday of the eighth week.

The general construction of the Gnome engine, which, with the exception of the cast-iron pistons and various minor parts, such as bushes, lubricating pump, casing, &c., is constructed entirely of steel, is so well known through their extensive use at practically every aerodrome throughout the country, that it is hardly necessary to give a full description ; but the design of the details is not so familiar to many, and the accompanying illustrations will, under such circumstances, be of interest. The power curve of the first Gnome engine constructed by the Daimler Co. for the Gnome Engine Co., obtained during a 24 hours'

test at the R.A.F., which test was carried out at a speed of 1,100 revolutions per minute, by the staff of the Aeronautical Inspection Department, is also given.

Particular attention may be drawn to the construction employed in the carburettor system, in the lubricating system, and in the operating valve gear. The carburettor (see Fig. 4) is of the floatless type, the jet being supplied direct from the fuel tank, and it is attached to the extremity of the fixed hollow crankshaft by means of a screwed connection. Air passes through the main trumpet as well as *via* a smaller air inlet orifice round the jet, which is placed within the throttle-valve, so that the main air supply is regulated by the throttle and the additional supply is free. After carburation, the gas enters the crank-case, and is drawn into the cylinders in succession through the automatic inlet-valve in the piston-head.

The oil pump is mounted upon the fixed rear end plate (see Fig. 2), and contains four plungers, two of which serve as valves, while the other and larger pistons operate as pumps. These plungers are driven by cams through a worm gear from a train of epicyclic gears on the opposite side of the end plate, which are in turn driven by a gear wheel attached to the rotating crank case. Each pair of plungers—valve and pump—which are spring returned, is independent, and the oil is forced through separate leads to two internal pipes within the crankshaft. One of these pipes (see Fig. 4) supplies the oil to the connecting rod ends through radial oil holes drilled through the walls of the crankpin ; whilst from the other, the oil is led through the interior of the inner portion of the crankpin, down through a hole passing inside the crank-web to the portion of the crankshaft carrying the cam gear, whence, by radial holes, it is conveyed to the cam sleeve, and, by a special oil groove cut at the end of the shaft, to the valve timing gears. The bearings throughout being of the ball type require the minimum quantity of lubricant, and such is afforded by the oil which is thrown out from the various parts which are directly lubricated.

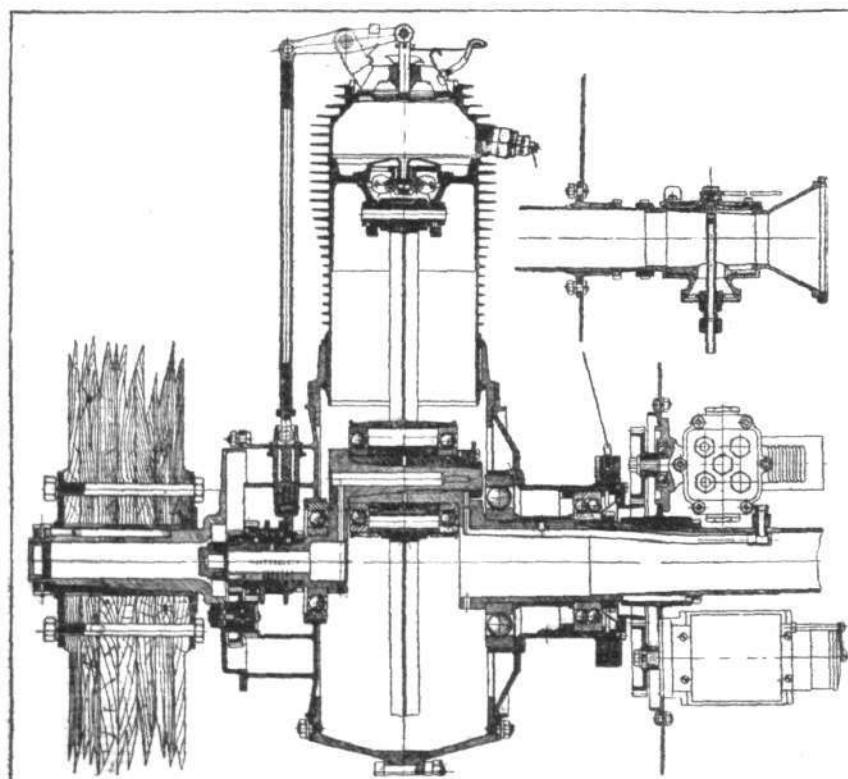


Fig. 4.—A longitudinal sectional elevation of the 80 h.p. Daimler-Gnome engine.

As regards the valve-operating gear (see Fig. 4), this is entirely enclosed within the end casing of the crank-case. The driving pinion (see Fig. 3) is mounted upon the end of the crankshaft, and meshes with two pairs of wheels carried by the rotating crankcase, another gear wheel

out a helix on its circumference, holes are divided to receive the valve-tappet rod guides, the latter being held in position by a nut placed in the interior of the casing.

The simplicity of the construction of these parts is at

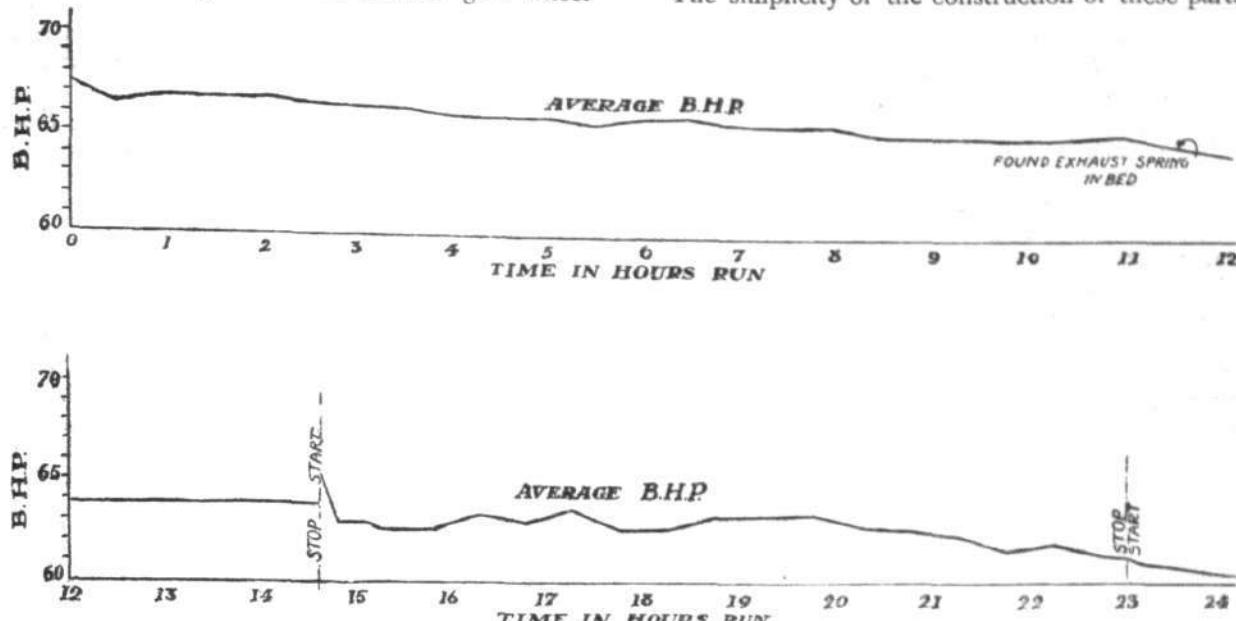


Fig. 5.—Power curve of the first 80 h.p. Daimler-Gnome engine obtained during a 24 hours' test at the R.A.F. by the inspecting staff of the A.I.D.

rigidly attached to and concentric with the cam sleeve which runs upon the crankshaft (see Fig. 4) engaging with each of the smaller of the pair of revolving wheels, thus forming an epicyclic train. Within the end casing of the crankcase at suitably disposed positions that trace

once apparent, and it is this simplicity characterising the whole design which is attractive, and has caused the Gnome engine to be so successful even in modern practice, where weight is not such an important factor as formerly.

## EDDIES.

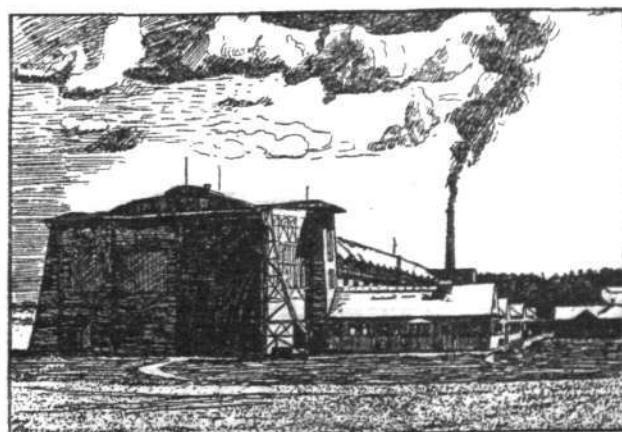
ONE hundred and twenty miles across the enemy's territory, and very mountainous country at that, is a feat of which our three daring flight officers, Squadron-Commander E. F. Briggs, Flight Commander J. T. Babington, and Flight-Lieutenant S. V. Sippe, may well be proud. In offering these three gallant men sincere congratulations from the whole of the readers of FLIGHT on their splendid exploit, I do not think I am wrongly interpreting their wishes. The actual extent of the damage done to the Zeppelin works cannot, of course, at present be ascertained, but judging by the various accounts, and the statements of the officers themselves, it must have

been pretty considerable. Anyway, the extent of the destruction effected does not in any way minimise the grandeur of the performance *per se*.

It was a bit of bad luck that Flight-Commander Briggs should not have been able to return safely to the French lines, but at any rate there is full consolation in the fact that he was "game to the end," and, although wounded, fought valiantly until overpowered. A message from Lugano states that he is the hero of the day in Switzerland, and that the Germans themselves recognise the merit of the flight is indicated by the fact that they have had the courtesy to send a message to England to say that he is out of danger.

Writing from Chicago, Ill., U.S.A., Earl S. Daugherty, the American aviator, tells me that he has bought a 50 h.p. Morane-Borel monoplane on which he is doing quite a lot of flying. The machine is similar to the one flown by Vedrines in his Paris-Madrid flight, and the Gnome with which it is fitted is said to be the actual one used by Vedrines. At any rate it is numbered 75, so it can't be very new. Up to the present it has, Mr. Daugherty says, thoroughly made good.

Things were busy at Hendon last Saturday, when a number of the pupils from the schools availed themselves of the calm weather to get in a few hours' practice. Considerable commotion was caused early in the afternoon by the appearance of that old Hendon favourite "Lizzie,"



The Zeppelin works at Friedrichshafen, the destruction of which was the object of the raid.

on which in the golden days of yore, Carr used to give his famous looping exhibitions. On Saturday, however, "Lizzie" was piloted by a less experienced man, and seemed to take advantage of the absence of a master hand by taking the bit between her teeth and cutting capers which have never been approached by Carr himself. It appears that a certain enthusiast has bought "Lizzie" with the object of teaching himself to fly, and that last Saturday was to be the dress rehearsal.

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Starting off from the corner at the top of the ex-half-crown enclosure, a very neat straight roll was accomplished in the direction of No. 4 pylon, with the tail well up. After some prancing about on the bad ground out by No. 4, "Lizzie" was persuaded to turn back into the wind, and before anybody had realised what was happening, she shot up in the air at an angle of about 45°, the pilot switching on and off all the while. By some kind whim of fate, which the newspaper correspondents would probably have described as superhuman efforts, "Lizzie" just managed to avoid a tail slide, and proceeded on a comparatively even keel towards No. 1 pylon, whisking her tail from side to side in the friskiest of ways. The pilot evidently considered this the moment appropriate for coming down, a performance which he seemed likely to accomplish in quite good style, for he descended in a pretty good glide switching on and off, but unfortunately he spoilt it at the last moment by not flattening out sufficiently and by keeping his engine running all out after touching the ground. The result was that "Lizzie" took matters into her own hands and did a loop the wrong way round, finishing on her back, whilst the pilot was seen to drop out of his seat on to the top plane. He was up again in a second, however, waving his hands to show the anxious onlookers that he was none the worse for his "spill." As a fact, the only damage done was a broken propeller and a bent shaft. It is to be hoped that "Lizzie" will soon be out of hospital again, since her owner is evidently made of the right stuff, and should, with a little patience, turn out a good pilot. Most initiates would certainly have made a worse job of it than he did.

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A new Sopwith biplane was seen at Hendon lately, which is expected to far out-class, as regards speed, anything hitherto turned out by this enterprising firm. It would obviously not be wise to give a very detailed description of this new machine at the moment, but the following particulars should convey some idea of its

general "lay out." In shape, if not in construction, the new scout is of the "monocoque" type, having a circular section *fuselage*, which offers a minimum of head resistance. The engine is totally covered in by a hemispherical cowl, sufficient air for cooling being allowed to enter the cowl round the propeller-shaft, and to escape underneath the *fuselage*, where the cowl does not quite touch the under surface. The planes are not staggered as in the usual type of scout, and are almost flat on the under surface. The tail is perfectly symmetrical, and the fixed stabilising plane placed on the centre line of the *fuselage*. The chassis is of the very simplest type, consisting of two "Vs" without any skids.

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In the hands of a capable pilot the new scout should prove an exceedingly valuable acquisition to our aviators at the front, since it will in all probability be able to "make circles" round anything the Germans have got, and will in any case be an extremely difficult target to hit. I do not know her fuel capacity, but it is undoubtedly great enough to enable her to make dashes of considerable length into German territory, not forgetting the Friedrichshafen stunt.

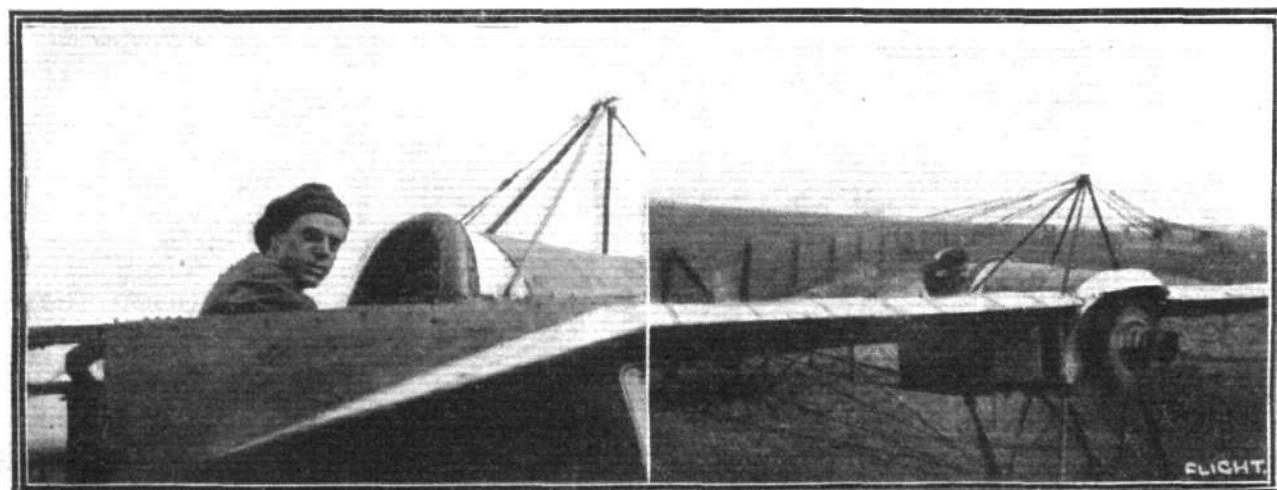
x x x

In addition to the machines already in use the pupils at the Hall school at Hendon will soon be able to enjoy passenger flights with their instructors, for a new two-seater biplane is nearing completion, and will when ready be fitted with the 45 h.p. engine from the machine formerly owned by Mr. Prosser. Another biplane of the "pusher" type is under consideration, but more of that later when it has passed from the embryonic state in which it exists at present.

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The Germans appear to keep a sharp look out for our Naval aviators along the west coast of Schleswig-Holstein. According to a Danish friend who writes me, the German seaplanes are seen regularly twice a week coming up from the South and continuing up along the west coast of Jutland, Denmark. In the afternoon they are making the return journey, always just outside the three-mile limit. Occasionally they are accompanied by a Zeppelin, but more usually they are alone. My correspondent expresses the wish, in which we can all heartily join, that IF the Germans succeed in getting some of their Zeppelins to England, they will be greeted warmly by a hail of shrapnel and other bric-à-brac and brought down.

"ÆOLUS."



Earl S. Daugherty, the American aviator, in his Gnome-engined Morane-Borel monoplane. This machine is the fifteenth Mr. Daugherty has piloted. On the right he is seen just getting away.

## FROM THE BRITISH FLYING GROUNDS.

## Brighton-Shoreham Aerodrome.

**Pashley Bros. and Hale School.**—Dual control with instructor, last week, J. Morrison, A. Goodwin, G. Charley, J. Sibley. Instructor behind pupil, Menelas Babiotis. Figure eights and circuits alone, C. Winchester, J. Woodhouse, T. Cole. Machines in use, Pashley and H. Farman biplanes.

## Eastbourne Aerodrome.

INSTRUCTORS during last week F. B. Fowler, R. C. Hardstaff, on E.A.C. biplane. Pupils with instructor on machine, Flight Sub-Lieuts. Barnes, Pullin, Travers, Teesdale, Openshaw, Wood, Sibley, Gerrard. Flight Sub-Lieut. Iron, Mr. Bass-Sutton figures of eight or circuits alone. During week, Flight Sub-Lieut. Iron completed tests. Mr. Bass-Sutton passed tests A and B.

## London Aerodrome, Collindale Avenue, Hendon.

**Grahame-White School.**—Sunday, last week, Probationary Flight Sub-Lieuts. Cooper, Dalison, Ffield and Driscoll straights with Instructors Manton, Russell and Shepherd. Probationary Flight Sub-Lieuts. Groves and Hodsoll straight flights alone.

Wednesday, Probationary Flight Sub-Lieuts. Barnes, Breese, Cooper, Dalison, Driscoll, Ffield, Livock, Wakeley, Watson, Young and Mr. Greenwood straights with Instructors Manton, Shepherd, Russell and Winter. Probationary Flight Sub-Lieuts. Bray and Groves solo straights and half circuits, Hodsoll and Mr. Carabajal circuits, &c., and Probationary Flight Sub-Lieuts. Watson and Price solo straights. Mr. Carabajal *brevet* tests, which he passed most satisfactorily and secured his certificate.

Thursday, Probationary Flight Sub-Lieuts. Cooper, Dalison and Driscoll straights with Instructor Manton.

Friday, Probationary Flight Sub-Lieuts. Bray, Groves and Hodsoll solo circuits. Probationary Flight Sub-Lieuts. Cooper, Watson and Price solo straights and half

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## AIRCRAFT AND THE WAR.

In a despatch from Nancy on November 18th, describing the operations in the Nancy district from August 22nd to the second week in September, a *Times* correspondent wrote:—

"Meanwhile, as they suspected, the Germans were placing their heavy guns in position. On September 4th German airmen flew over the plateau at a great height, and once they had made out the whereabouts of the French artillery the men working it had little rest. Four German batteries opened fire upon them, and the shells fell thick and fast, with a deafening din. At one time the fire was so severe that the French took refuge in the village. But here as well they were quickly detected by the enemy warplanes and captive balloons, and followed by a volley of shells which sent the villagers scuttling to their cellars or flying over the fields."

The *Morning Post* correspondent in Belgium wrote on November 18th:—

"German superiority in heavy guns, in air service, and in what may be generally described as 'Staff' work, has been marked in the early stages of the war. In all other particulars the Allies have proved superiority. With better heavy guns, better field artillery, better cavalry, better infantry on the side of the Allies, the Germans can be left superior in the air without much disquiet—especially during the winter months."

Writing from Paris, under date of Nov. 18th, to the *Daily Chronicle*, Mr. G. H. Perris, said:—

"The aeroplane has enormously succeeded in scouting work; and here, again, the Allies probably now have a definite superiority, which will steadily increase."

"The throwing of bombs from aeroplanes has not often been very effective."

## FLYING GROUNDS.

circuits. Probationary Flight Sub-Lieuts. Barnes, Breese, Dalison, Driscoll, Ffield, Livock, Wakeley and Young straights with Instructors Manton, Shepherd and Winter.

**Beatty School.**—Monday, last week, weather very bad so no school work was possible. Pupils receiving instruction during the week with Instructors Mr. Geo. W. Beatty and W. Roche-Kelly, on "dual"-controlled 50 h.p. Gnome biplane and 40 h.p. Wright biplane.

Tuesday, Messrs. Virgilio (15), Parker (12), Whitehead (5), Anstey-Chave (5), and Wainwright (5).

Wednesday, Messrs. Virgilio (15), Leeston-Smith (15), G. H. Moore (15), Anstey-Chave (15), Donald (15), Wainwright (15), and P. E. Cornish (new pupil, 15).

Thursday, Messrs. Leeston-Smith (10), G. H. Moore (15), and P. E. Cornish (15).

Friday, Messrs. Virgilio (15), G. H. Moore (15), Newberry (10), Anstey-Chave (15), Donald (15), Wainwright (15), Perrot (new pupil, 10), and P. E. Cornish (15).

Week end weather so bad that no school work possible.

**British Caudron School.**—Monday, last week, too windy for school work.

Tuesday morning, R. Desoutter half-hour's test flight on 60 h.p. two-seater Caudron biplane, preliminary to handing over to Admiralty.

Wednesday, school out at 7.30 a.m. Messrs. Barfield and Stevens doing right and left hand half circuits. Mr. Williams rolling well. Probationary Sub-Lieut. Bird doing very good straights. Thursday, weather very bad.

Friday, school out at 8 a.m. under the instruction of R. Desoutter. Messrs. Barfield and Stevens doing right and left hand half circuits in good style. Sub-Lieut. Bird right and left hand circuits, making very good progress. Saturday, windy.

**Hall School.**—The instructor of the week, J. Rose. Pupils going straights alone, Lieut. Sandys 12 straights, and A. Davy 2 straights, W. J. M. Connachie 15 straights

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## AIRCRAFT AND THE WAR.

In the German "wireless" news sent out from Berlin on the 19th inst. was the following:—

"A German aviation squadron encountered some enemy aviators making a reconnoitring flight, and caused them to descend, one of them falling. One of our flying machines is missing."

An official announcement issued in Paris said:—

"On Wednesday afternoon a German aeroplane alighted in the French lines near Rheims. The two officers on the machine had lost their way. They rushed, revolver in hand, upon a peasant woman to question her as to the locality; but at the same moment a group of horsemen belonging to army headquarters intervened and captured the two airmen and their machine."

According to the *Frankfurter Zeitung* a German airman had flown over Cronstadt, the great Russian fortress.

Mr. Alec Rutherford, writing to the *Daily Mail* under date of November 19th, and dealing with the fighting round Ypres, said:—

"At daybreak the enemy were observed advancing in thousands, and they were met by the heavy artillery in front and on the two flanks. They were mowed down in hundreds and could not ascertain the position of our guns, despite the repeated reconnaissance of the aeroplanes."

In a later message, dated Saturday, he wrote:—

"It was victory all along the lines of the \_\_\_\_\_ Division, who now occupy the German positions. Throughout this fighting the Germans were using an old stationary Zeppelin to ascertain the position of the British troops, and at times it was distant only 800 yards. But orders were given not to fire upon it—a wise precaution, as it would have disclosed the position of the troops to the enemy, whose guns were in close proximity, and had they opened

fire on our troops a certain victory might have been turned into a retreat. It is such strategy as this—work of level-headed officers—that makes our victories more complete."

Mr. T. E. Elias, a *Daily Chronicle* correspondent, sent the following from "Northern France" on Nov. 20th:—

"The wind dropped, and within a short time aeroplanes began to dot the sky. The Germans were first into their machines. Four 'Taubes' approached the Allied lines at a great height, and were soon opposed by two French and two English machines. A thrilling battle ensued, which, although not by any means the first aerial combat of the war, was the most stirring event in the day's fighting. The eight pilots approached one another, then swept around in circles, rose and descended, rose and encircled one another again with the object of gaining an advantage. For ten minutes these evolutions continued, whilst the eyes of all the fighting men of both armies below were centred on them. Mitrailleuses cracked in all directions, but with no success. Suddenly the Allied aeroplanes fled from the fight. They flew in parallel lines one over the other, and the Germans pursued them at a tremendous speed. Too late the pursuers realised their danger. Literally a shower of shells from some hidden French batteries exploded around them. They had been enticed into a trap. Within another five minutes all four enemy machines were shattered. They fell in front of the English lines. Their officers and pilots—eight men—were killed instantaneously. Our own machine then volplaned to the ground, having accomplished their work with as much skill as luck."

A battle in the air was thus described by the *Daily Mail* correspondent on the 20th inst.:—

"An exciting aerial contest took place two days ago at Amiens between three German Taubes which had come to throw bombs on the town and a French armoured aeroplane which endeavoured to tackle the enemy craft single-handed. The German aeroplanes dropped five bombs. One of them hit the St. Roch Railway Station, and did considerable material damage to telegraph and telephone wires besides tearing up part of the track. A railway employee was killed and several others wounded. A second bomb hit the gasworks of the town. The gas caught fire but the flames were quickly extinguished by a party of military engineers. A third bomb fell on a group of horses which were being taken to be watered, and killed thirteen. The two other bombs did not explode. The approach of the hostile aircraft had been signalled, and a French machine rose to fight them. She carried a machine gun, as did the German machines, and soon a magnificent aerial fight was in progress. The Germans manœuvred their machines very well, but clearly showed that though superior in number they were not willing to engage in a combat. For some time the four machines circled round firing as fast as they could. Eventually, however, the German aeroplanes managed to get ahead of the French aeroplane and flew off towards the German lines."

From inhabitants of Soissons who arrived in Paris on Saturday, information was obtained that at ten o'clock in the morning a German aeroplane flew over the town trying to discover the French batteries. It was attacked by a British machine and tried to return to the German lines, but a 75mm. shrapnel brought it down near Soissons. It is said that there were two officers and a mechanic on board, and that all were burnt to death.

A Central News message from North-Eastern France, on Saturday, stated:—

"Yesterday morning at 9 o'clock a German biplane dropped three bombs here in an attempt to destroy the railway station. The bombs dropped 80 yards away, killing one civilian and wounding two others, besides smashing the windows of the houses on both sides for nearly 200 yards . . . ."

"The Prince of Wales on Thursday inspected the headquarters of the London Scottish. It is believed that the German aviators are looking for His Royal Highness, but many of these fellows have lost much of their daring."

The following notes with regard to the arrows now being used by the Allied aviators were given by Mr. T. F. Farman in his article on "The Aeroplane War in France," in last Saturday's issue of *The Field*:—

Many of the French avions carry into the air a large supply of darts (flechettes), which have proved to be deadly weapons. While bombs dropped from aeroplanes can destroy buildings, wreck trains, encumber railway lines and roads, blow up convoys of ammunition or supplies, disable batteries of artillery, &c., the darts are of great utility to spread panic by decimating corps of troops advancing to the attack or retreating.

"There can be no reason to refrain from speaking of them because the Germans have already copied the French dart and used it against the Allies. Indeed, many German darts have been found on the battlefield bearing the inscription, 'French invention, made in Germany.' The French dart is about  $4\frac{1}{2}$  in. long. It is stamped out on a steel rod; the tip is pointed like a bullet, behind which the steel rod is reduced to the dimensions of a thick wire, the extremity being furnished with what may be described as steel feathering, acting like the feathers of an arrow, and insuring the descent of the dart point downwards. Its weight is only 20 grammes, so that an ordinary military aeroplane, capable of carrying into the air 250 kilogs. (550 lb.), can have on board no fewer than 12,500 darts. It is needless to describe the means by which they are dropped. It suffices to say that falling on a man from the low altitude of only 200 meters (656 ft.) the dart will surely kill or wound him as a bullet fired from a rifle. It should be remembered that most of the French military avions can transport a load considerably superior to 250 kilogs. (550 lb.), and that every additional kilogramme represents fifty additional darts.

"A weekly medical periodical published at Munich contains a note by Dr. Volkmann concerning the character of the wounds inflicted by the French darts. A soldier hit on the head was killed on the spot. The dart which struck another man on the shoulder traversed the whole of his body, &c. Dr. Volkmann and one of his German colleagues, Dr. Gunberg, affirm that the darts dropped from aeroplanes are extremely dangerous, and that the wounds inflicted by them are almost always mortal."

The following was sent on November 21st by the *Daily Chronicle* correspondent in Northern France:—

"I also heard from the same prisoner, who had been a mechanic attached to the Flying Corps, that there are only one or two Taube aeroplanes left, and that the principal machine now used is the 'Aviatik' biplane, which has an armoured prow fitted with a machine gun. The manufacture of the Taube type has been stopped, as the machines have been far from satisfactory."

"One of the enemy's pilots has adopted a very cute dodge to obtain photographs of our position. It consists of a small camera fitted with a telephoto lens, which is let down by means of a cable while the machine flies over the entrenchments; a second cable controls the trigger, and a dozen films can be exposed at one 'cast.'

"The erstwhile mechanic who told me these things was once in a motor factory in the Midlands, and he is very bitter against the officer who, having descended too near the Allied lines, went off again in a hurry and left him behind, with the result that he was shot at several times before he made a French patrol understand that he wanted to surrender."

A *communiqué* issued in Berlin last week stated that the German factories, working at high pressure, had produced a great number of aeroplanes in August and 10,000 persons have offered to learn flying, so that now aeroplanes can be utilised to a greatly increased extent.

In a message to the *Daily Mail* from Dunkirk on Sunday evening, Mr. G. Ward Price wrote:—

"From a French airman who flew over Ypres to-day I learn that the famous town hall was blazing and that its belfry had fallen in. The Germans are still fiercely bombarding Ypres."

A *Daily Telegraph* correspondent at Paris wrote on Sunday:—

"Germans captured near Ypres state that ten days ago the Kaiser spent four days at Roulers. Quarters were engaged for him in two houses at opposite ends of the village. The Kaiser wore the uniform of a cavalry sub-lieutenant, and was continually passing from one house to the other. These elaborate precautions are the best compliment to the Allies' air service."

The *Daily News* correspondent, Mr. H. Cozens-Hardy, sent the following from Paris on Sunday:—

"A Hanoverian prisoner captured by the British near Dixmude last Wednesday declares that the German officers fear the aeroplanes of the Allies—not only because of the bombs, but also because of the London and Paris newspapers they drop. The German soldier is shot if a French or English newspaper is found in his possession."

The Dutch *Telegraaf* had news that sheds for flying machines destined for Knesselaeere are now being built at Meirelbeke, near Ghent.

A *Times* correspondent, in a letter from Lubeck, dated November 8th, said:—

"I gather from men who know a great deal about the aerial work of Germany that about 35 to 40 Zeppelins are ready for

immediate use and that about 15 are being built, besides some smaller and less important types. It is difficult to say how the Germans will employ their aerial fleet, but that they will make use of it is certain. They have for a long time been busy in Belgium building sheds for their airships. In the near future a Zeppelin raid will doubtless be attempted on London, the most hated city in the world, as they call it. However, the Germans fully realise that it would be a very risky affair, and that the damage they could do would not be great."

On page 1152 will be found the Admiralty announcement regarding the raid by R.N.A.S. pilots on the Zeppelin works at Friedrichshafen, and below are given accounts from other sources. Mr. Alan Bott, the *Daily Chronicle* correspondent at Basle, wired on Nov. 22nd:—

"Much excitement was caused in Basle yesterday by the whirring noise of an air motor, and a few minutes afterwards those of us who were standing on one of the Rhine bridges saw a large biplane travelling at a great height towards the Black Forest. Some 20 minutes later two other machines followed it. The aeroplanes were seen at various points along the Swiss-German frontier, and a few minutes before one o'clock they made their presence known to the inhabitants of Friedrichshafen by dropping six bombs aimed at the Zeppelin works on the lake shore, from a height of 1,200 ft.

"German official reports say that only two aeroplanes appeared over the Zeppelin town, and that the bombs did no mischief beyond damaging two houses, besides killing a civilian and wounding two women. On the other hand, I am in possession of details sent by a reliable correspondent at Romanshorn, which faces Friedrichshafen on the Swiss side of Lake Constance. He declares that onlookers saw at least four machines, and that one of the bombs fell on the large airship shed and broke the glass roof.

"It is a significant fact that the super-Zeppelin in this particular shed was to have been taken out for the first time yesterday, while up to the time of writing it, or what remains of it, is still in its damaged home. Immediately the aeroplanes were sighted over Lake Constance a storm of shrapnel and shots burst around them from guns and mitrailleuses at Friedrichshafen and from gunboats of the German lake flotilla. Guns at Constance, Meerburg and Immenstaad joined in the bombardment. One of the machines was hit several times, and the aviator was obliged to plane down in spiral curves, with the motor shut off. The aeroplane itself was not greatly damaged, but pilot — (name cut out by Censor) was taken to hospital with severe wounds to his head and hands.

"Meanwhile the other raiders had risen to 1,800 ft. and escaped. They again passed near Basle in the middle of the afternoon, and later they landed safely in France, somewhere in the neighbourhood of Belfort."

In a later message Mr. Alan Bott said:—

"Later information from Romanshorn confirms the report that a bomb from a British aeroplane crashed through the glass roof of the large Zeppelin factory, making a hole from two to three yards square. Much damage was done to material intended for building airships, and the damage otherwise done was great."

A *Daily Mail* correspondent wired from Vevey on Sunday:—

"A daring raid on one of the Zeppelin sheds at Friedrichshafen was made by two English naval airmen yesterday. Their approach having been signalled, they were greeted with a furious outburst of shrapnel and rifle fire. Circling thousands of feet above the airship sheds the aviators dropped five bombs. One pierced the roof of the motor workshop, doing considerable damage, but the Zeppelin airship, inflated and ready to leave for Belgium, was not damaged. Two houses were damaged by the bombs, one man being killed and a woman injured.

"Reports from Romanshorn state that one aviator was brought down through a projectile striking the petrol tank. The aviator was bleeding profusely from a head wound caused by a German soldier. On alighting the aviator only escaped being lynched by the intervention of soldiers. The audacious attack lasted thirty minutes and caused a great commotion in Friedrichshafen. The second aviator is reported to have escaped, as he was seen later on over Bâle."

The following is the account sent out by German "wireless" from Friedrichshafen on Saturday:—

"Two English flying machines appeared over the town at about one o'clock this afternoon and attempted to carry out an attack on the airship wharf. One aviator who circulated above the workshop at a height of about 400 metres was quickly shot down with shrapnel and machine gun fire by the balloon defence detachment. The other aviator, who kept at a considerably greater height, and who

repeatedly circulated round the workshop, succeeded in escaping, but according to later, yet unconfirmed, reports he is said to have fallen into the Boden Lake.

"The aviators dropped five bombs, which partly exploded, in the immediate neighbourhood of the workshop. Two houses in the town were damaged, one man being killed and one woman injured. The occupant of the flying machine which was shot down is an English naval officer. He is seriously wounded, and was taken to the hospital. The workshops of the balloon construction works are undamaged."

The French official account is as follows:—

"Three British airmen left France on November 21st by air for the Zeppelin factory at Friedrichshafen. Despite artillery fire directed against them during a journey of 250 miles wholly over the enemy's territory, the three aviators reached their goal and bombarded the factory, which is believed to have suffered considerable damage. One of the aviators seems to have been wounded. The other two returned to France with their machines more or less damaged by the enemy's fire. This long flight over one of the most mountainous regions of Germany was executed in unfavourable atmospheric conditions. It is another fine exploit to the credit of British airmen."

The following details were sent by the *Lokalanzeiger* correspondent at Friedrichshafen:—

"Two (deletion by Censor) airmen were signalled to-day at noon from Constance flying in the direction of Friedrichshafen. The military authorities were at once informed. At 12.30 both airmen appeared over the town and performed a circular flight. The balloon-gun detachment immediately started firing on the biplanes with shrapnel and machine guns. The first aviator descended with a *vol plane* to within 300 metres of the airship hangar and threw out bombs, without, however, causing any damage. The petrol tank of the flying machine was pierced, and the petrol ran out. The aviator was obliged to descend in the Zeppelin works' yard within a hundred metres of the hangar. The crew of the Zeppelin and military guard at once rushed to the machine and pulled the aviator out. He was taken to the caretaker's house, where he collapsed unconscious. He was slightly wounded in the head, and was, therefore, sent in a motor car to the prisoners' quarters in the hospital.

"The second aviator dropped bombs near the town and the railway station, and damaged three houses slightly. The aviator then returned to the Zeppelin works and threw bombs without causing damage. He escaped being hit, and flew off in the direction of the lake. The machine of the captured aviator was dismantled and taken to Manzell. (Deletion by Censor.)"

The Stuttgart correspondent of the *Berliner Tageblatt* telegraphed on Saturday night:—

"Three aeroplanes, not two, as was previously telegraphed, flew over Friedrichshafen at about a quarter to one. The two or three bombs which the first aviator dropped while descending caused no damage. While this was happening the second aviator appeared above the yard of the works and dropped several bombs, which caused no damage. He flew off, but returned after a short time and made a second vain attempt to hit the hangar. He then flew away in the direction of Manzell, after making a last attempt, when the bombs fell into the lake. He finally disappeared in the direction of Switzerland.

"The third aviator gave up his intention, probably owing to the heavy firing, and disappeared. One machine and its pilot were captured. The machine, which was intact, had an 80 h.p. Gnome engine. The pilot—(deletion by Censor)—attempted to resist arrest by firing his revolver, but was seized by the guard. He had, however, to be thrown forcibly from his seat. His head, which was bleeding, was bandaged in a neighbouring *café*, whence he was sent to hospital. (Deletion by Censor.) His wounds are probably not mortal."

The Geneva correspondent of the *Journal* sent the following particulars:—

"One of the bombs dropped on the Zeppelin works at Friedrichshafen by the British airmen did considerable damage to a large hangar, and is thought to have destroyed a large Zeppelin which had just been completed.

"Another of the six or eight bombs thrown fell through the roof, making a large hole. All the windows were blown to bits, and great damage was done inside the building. A dirigible, which had just been completed, and had been filled with gas on the previous day, was about to start on a trial trip. The damage done to it appears to be very great, but the employees at the works have received strict orders to hush the matter up."

In a despatch from the *Morning Post* correspondent,

dated Tokyo, October 17th, received in London on November 23rd, was the following:—

"Japanese aeronauts have made daring attempts at blowing up important buildings connected with the fortress at Tsing-tau, with but partial success, however. After each flight the airmen returned with their machines riddled with bullets, showing how close they had ventured toward the enemy so as to make sure of their aim. In this way the barracks, the wireless telegraph station, and the Governor's residence have been damaged, as well as some of the gunboats in the inner harbour, the fire from which had considerably interfered with the operations of the right wing of the investing army. As soon as the gunboats opened fire on the Japanese position the aeronauts began harrassing them with bombs, resulting in sufficient excitement among the gunners to render their aim for the most part ineffective."

Writing from Boulogne on Tuesday, a *Daily Telegraph* correspondent said:—

"A 'Taube' flew over Hazebrouck on Saturday at nine in the morning, throwing five bombs.

"The missiles were intended for the Central Station, but with one exception, they all fell far from the mark. Several people were injured, and two are said to be killed. A signal-cabin near the station was completely wrecked."

Another message said that a second German aeroplane flew over Bailleul dropped a bomb on an ambulance, and killed three British wounded.

In a semi-official account of the operations from November 15th to 21st issued in Paris on November 23rd were the following references to aircraft work:—

"From the sea to the river Lys our artillery, perfecting its aim as the result of information from our aviators, has on several occasions silenced the enemy artillery. . . .

"On the front from the Oise to the Argonne our aeroplanes, in spite of rain, followed by keen cold, have done very good work. The services which they have rendered our artillery by enabling it to regulate its fire have been already mentioned. They have also on two occasions, on the Aisne and to the east of Rheims, compelled enemy aeroplanes to interrupt their mission and return to the German lines."

Writing from Petrograd to the *Daily Mail* on Monday Mr. H. Hamilton Fyfe said:—

"Winter has not yet really arrived in that part of Poland where the battle is going on. Both sides are hoping for harder weather, the Germans because the present state of the roads and fields makes the movements of troops and guns very difficult to an army accustomed to manœuvre under pleasanter and easier conditions. It also throws obstacles in the way of the use of aeroplanes, upon which they depend chiefly for information, either because they are short of horses or because they are saving up cavalry for future use. The Germans are making little use of the mounted arm, therefore it is essential to them to be able to send up airmen constantly. The wet ground, which is frozen during the night and thawed by the sunshine during the day, and often reduced to a morass, is the worst for landing. Two German aeroplanes have been bogged and have had their wings broken during the last few days through descending in such places."

Writing from the North of France to the *Daily Mail* on Monday, Mr. Basil Clarke said:—

"Midday is the usual hour for German aeroplanes to visit Dunkirk. So much so that midday is no longer known as twelve o'clock, but as 'Taube o'clock.' Half-past twelve is thus *Taube et demi*, and so on. Our last few visits have been comparatively harmless. But inland towns near us have been less fortunate of late than Dunkirk. On Friday, at 9.30 a.m., six bombs were let fall on Hazebrouck, where at the moment a recruits' examination was being held, causing big crowds in the streets about the town hall. Two bombs fell near the station, one in the Rue de Près, two in the Rue des Hollandais, and another in a private garden. The one in the Rue des Hollandais was the most harmful. Windows and doors on both sides of the street were burst in; three passing refugees were wounded badly. One had both arms blown off. He died on arrival at the hospital. Later came the bomb-dropping on Cassel, killing a woman and a child, of which I telegraphed you the same day. Later a visit to Poperinghe, which, as the town lies on the one open side of Ypres, the west, is filled with troops of all the Allied nations. Bombs fell on the church of St. Hubert, which was much damaged. Three people were killed—civilians, of course. At Amiens the same day fifteen bombs were let fall. Altogether a dirty day's work!"

The *Times* correspondent at Boulogne wired on November 24th:—

"Further particulars have reached me of the Taube attack on Hazebrouck last week. Six bombs were thrown. One fell in the Rue des Hollandais. On both sides of the street windows were broken and doors pierced by the bullets. Two refugees were seriously wounded. A workman had both arms blown off, and was also struck in the chest by a splinter of the shell."

"At Armentières two 'Taubes' have been brought down by British gun-fire."

In a despatch to the *Daily Chronicle* from Northern France, on November 24th, Mr. T. E. Elias said:—

"German aviators have thrown bombs on Hazebrouck, Cassel, Amiens, and Armentières. Civilians were killed in each place, and at Armentières alone were the aviators punished. Here they exposed themselves to the fire of English aerial guns. Two of their machines were brought to the ground, and their four occupants killed."

Writing to the *Daily Mail* on Tuesday from Rotterdam regarding the bombardment of Zeebrugge, Mr. James Dunn said:—

"The Germans in Zeebrugge became demoralised. In desperate haste they attempted to remove their stores to Bruges, including the apparatus for making hydrogen for Zeppelins, but a section of the railway had been blown up."

"Before the bombardment the British warplanes scouted the north-west of Belgium, giving the disposition of the troops and guns."

The Sluis correspondent of the *Tyd*, writing of the bombardment of Zeebrugge, wrote:—

"Immediately after dawn English airmen reconnoitred the coast, where the German artillery was concealed with extraordinary cleverness, being partly buried in the slopes of the dunes with their muzzles pointing seawards. After the airmen returned to the Allies' lines the latter made attacks on the German infantry near Nieuport in conjunction with the Franco-English squadron which, continually firing, approached the coast."

The following was sent by the *Morning Post* correspondent at Christiania on November 24th:—

"It is reported from Langesund, on the southern coast of Norway, west of Christiania Fjord, that the Custom House officer observed an airship at midnight on Saturday, near the Norwegian coast, flying in a south-western direction from Langesund Fjord. The airship showed alternately red and white lights. For ten minutes it remained apparently stationary, and then moved off slowly in a western direction, finally disappearing over the south-western horizon. The officer's wife observed the vessel at the same time. The Scandinavian countries have no airships."

Advices were received in Washington on Tuesday from Petrograd to the effect that a bomb from a German airship has fallen in front of the American Consulate in Warsaw, breaking the windows, but doing no injury to anyone within.

The following was received in London on Nov. 24th from the *Daily Chronicle* correspondent in Northern France:—

"The thousand pounds offered by the Germans for the capture, dead or alive, of Commander Samson, of the Royal Naval Flying Squadron, is another proof of how the enemy is impressed by the successful dropping of bombs from our skycraft. Commander Samson returned after carrying out a peculiarly successful and daring flight over the enemy's lines. Leaving his base early in the morning, he made for the direction of Ypres and Courtrai. The temperature was bitter—5° below freezing point—and no opposing aeroplane ventured out under such conditions. Flying low, Commander Samson dropped several bombs amid a body of cavalry, who quickly dispersed, leaving many dead and wounded. Despite shots from shrapnel and anti-aeroplane guns, Commander Samson proceeded with his flight into the hostile area, and hurled bombs on the railway lines south of Bruges. Then, satisfied with his work, he returned unharmed, and took a little 'exercise' on horseback."

"A Naval airman tells the following story: 'During the recent bombardment of the German right wing by the monitors a Naval aviator who was directing the fire of the British cruisers was hit by a German bullet and forced to descend in hostile territory. He could see no enemy and was preparing to escape, when he heard a German voice say in good English: "Hi, where the — are you going? Come and have lunch."'

"The airman had no option but to obey. He went with his captor, and had a good lunch. The Germans treated him well, and three days afterwards he escaped during a night attack, in which the enemy were forced to retreat hastily."



Edited by V. E. JOHNSON, M.A.

**Aeromodellists Serving with the Colours.**

MR. J. C. BALDEN (Hon. Sec., Scottish Aeronautical Society Model Aero Club) writes as follows:—"I notice in a recent issue of FLIGHT that you desire to publish the names of aeromodellists serving with the Colours. I enclose a list of members of this club (printed below) now doing so. Might I suggest that a *complete* list be published later on in the form of a Roll of Honour, say, as a supplement, so that one could have it framed. Your Christmas number would, I think, be a suitable time to bring it out."

*Members of the Scottish Aero. Soc. (Model Section) Serving with the Colours.*

Private Charles F. Arthur, 3rd Batt. H.L.I. <sup>+</sup>

Private William Craig Boyd, 5th Scottish Rifles. <sup>+</sup>

Second Lieut. Andrew Forson, 3rd Batt. Royal Scots Fusiliers. <sup>+</sup>

Private Eric P. Fairbairn, 9th Batt. H.L.I. <sup>+</sup>

Private George E. C. Hunter, 5th Scottish Rifles. <sup>+</sup>

\* Kitchener's Army. <sup>+</sup> Territorials. <sup>+</sup> Army.

Mr. O. Hamilton, jun. (Hon. Sec., Stony Stratford Model Aeroplane Club), sends us the following communication:—"I see from the current issue of FLIGHT that you are anxious to compile a list of aeromodellists serving with the Colours, and I hasten to add our little roll to the list.

*List of Members of the Stony Stratford Model Aeroplane Club Serving with the Colours.*

Major L. C. Hawkins, Vice-President, Bucks Territorials.

Major Hooker, Vice-President, Bucks Territorials.

C. L. Matson, D Co., 2nd Public Schools Batt. Royal Fusiliers.

W. Palmer (Branch Secretary), Bucks Territorials.

Serjt.-Maj. Cherry, Royal Bucks Hussars.

G. Waller, Royal Field Artillery.

J. T. Curtis, Oxon and Bucks Infantry.

F. Fancutt,

Mr. Henry Gilbert writes: "According to your desire, it may interest you to know that I have joined the R.F.C., and expect to be sent abroad shortly."

Mr. Robert G. Leckie also writes: "Noticing your intimation in FLIGHT re 'Aeromodellists serving with the Colours' and being a regular reader I beg to be included in the 'List of Honour.' I am serving with the 3rd Glasgow Highland Light Infantry at present billeted in Troon on the Ayrshire coast.

"I get FLIGHT sent from home to me every week, and find it, as I have always done, most valuable and instructive, especially last week's edition on 'How to recognise German Aeroplanes.' This was all the more interesting as I am going in for a Scout's job, so may have occasion to use it, if I ever see the front. I have been a member of the 'Scottish Aeronautical Society' Model Section for some considerable time, but gave it up last year as my spare time became limited, but I have always kept doing a little model work now and again, with the result that I have a tractor biplane at present in the Glasgow Museum for which I gained a prize; FLIGHT to thank for this."

[Now that the ball has been set rolling, will other clubs and readers kindly follow suit?]

**Mr. Gavin-Brown's Rubber Motor.**

"Referring to Mr. Gavin-Brown's description of his twin rubber motor published in a recent issue," writes Mr. S. A. Goldring, "I have tried a very similar device myself on a single screw model, but found the simple duplex gear far more efficient, it being less than half the weight, and a far longer duration was obtainable. I am about to construct a 6-ft. span 'Bat-Boat,' in which the rubber will run



parallel to the leading edge of the main plane between the ribs (doubled surfaced as per rough sketch), the propeller being driven by bevel gearing.

"I shall be pleased to give you an account of the results of my experiments with this device as soon as I have carried them out. I might add that I have been a constant reader of FLIGHT for five years, and owe a great deal of my success as a model maker to the valuable information obtained therefrom."

**Mr. J. Grant's Biplane—Farman Type.**

"Please find enclosed two photos. of a Farman type biplane, which I have constructed. I have been a constant reader of FLIGHT, and have had volumes bound, and I have gained much useful knowledge from it. The machine is just a show model taken from scale drawings which have appeared in FLIGHT." [Judging from the photographs, the model is an excellent piece of workmanship, and does its builder great credit.]

**Replies to Queries.**

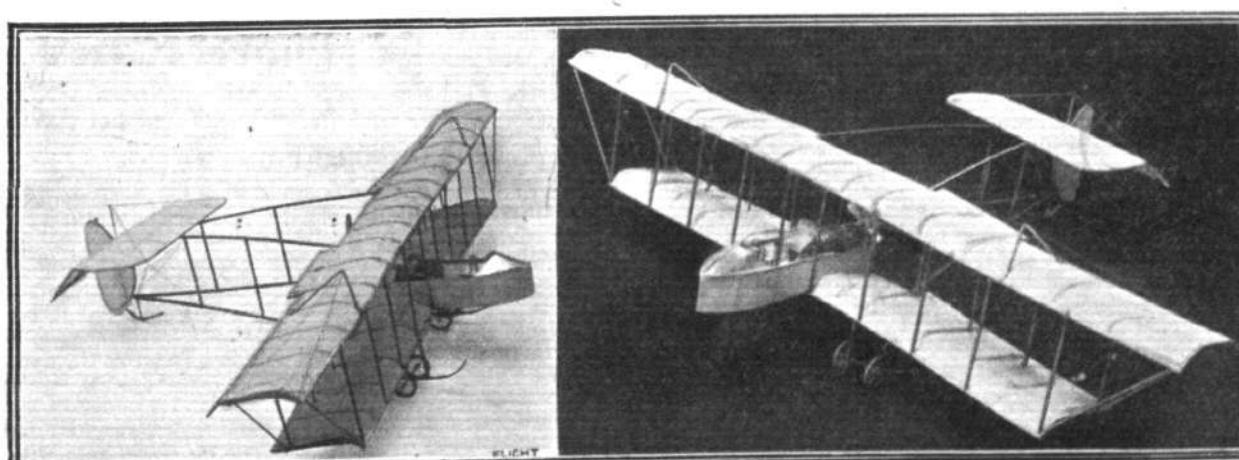
T. NAUGHTON.—Try the following: Messrs. A. W. Gamage, Holborn; Messrs. T. W. K. Clarke and Co., High Street, Hampton Wick.

**The Value of Model Experiments.**

The Aeronautical Journal for October last contains, amongst others, an article by W. Ellis Williams, B.Sc., on "The Pressure Distribution on an Aeroplane Wing in Flight." "A very large amount of work has been done," says the writer, "in measuring the forces on models of aeroplane surfaces placed in a wind channel, and the results obtained are of the greatest value to the designer. Doubt has, however, been thrown on the applicability of the results obtained to calculations referring to the full-sized aeroplane in flight, and it is of great importance to obtain definite information regarding the corrections, if any, which should be applied to wind channel results."

"The experiments described were made with the object of comparing the pressure-distribution on an aeroplane wing in flight with the distribution measured on a model of the same wing in a wind channel."

The writer draws the following conclusions: "On comparing the two curves it will be seen that the values for model and for wing are in very good agreement for all holes except Nos. 5 and 6, for which the pressures on the model are considerably greater than those on



Mr. J. Grant's Farman type biplane, constructed from scale drawings which have appeared in FLIGHT.

the wing. This is almost certainly due to the wing being slightly warped at the moment of exposure, although an effort was made to have the warp exactly neutral at the moment of exposure. Apart from these two holes the values agree with one another within the limits of experimental error, and show that wind channel experiments may be relied on to give accurate results when applied to actual full scale machines."

We strongly recommend a careful study of the above article to all aeromodellists.

*Apropos* of wind tunnel experiments, what has become of the proposed K. and M.A.A. Laboratory Competition? A series of wind tunnel tests for model aeroplanes to ascertain the best lift/drag ratio; these were to have been carried out this autumn. So far as we know, no further information has come to hand with respect to the rule 6: *A special fitting must be affixed to the model so that an attachment may be made from the underside of the model to the balance arm of the wind tunnel. The design of this fitting will be published later.* We are still awaiting the publication of this design. Even supposing that the ordinary sporting model competitions are at present in abeyance (although as a matter of fact this does not appear to be the case), we fail to see any reason why the above scientific competition should not be carried out.

#### Useful Model Work.

If the present-time sporting aeromodellist, instead of devoting his attention to machines built solely or mainly for distance or duration, were to devote his energies to models which should rise to as high an altitude as possible, he would be doing some most useful work. We are not permitted to speak any plainer at present, but we shall be pleased to hear, at the earliest possible moment, from any reader who may have specialised in this line, giving full particulars of results obtained.

#### Gun Fire and the Stability of Aeroplanes.

The writer had hoped to have been able this autumn to have carried out some experiments with models (of the weight-carrying type) carrying little cannons (made of thin steel tubing) fired by electricity, with a view to noting the effect of such on the path and stability of the model. He has, however, been unable to find the necessary time, and now, with a view to enlist the interest of someone else to do the same, he gives the following idea of what he had in his mind in reference to the design and method of carrying out the same.

The guns can suitably be constructed from steel rod or even  $\frac{1}{4}$ -in. wrought-iron rod about  $1\frac{1}{2}$  in. long, and drilled out to a depth of nearly an inch, leaving a thickness of about  $\frac{1}{16}$ th of an inch; they need not weigh more than  $\frac{1}{2}$  oz. each. Mount three such on a tiny turret capable of a limited amount of rotation. Each barrel is drilled with the usual old cannon touch hole. Well loaded with black gunpowder, such a little gun is capable of giving a very appreciable amount of recoil. To fire the guns automatically whilst the machine is in full flight, we must bring over the respective touchhole in turns something capable of igniting the powder. A small accumulator could be employed, by means of which a tiny piece of platinum wire placed in the circuit passing over the touch holes would be made red or white hot when the electrical circuit was completed. The turret carrying the guns if rotated and the circuit completed at the right moment would do this, firing say a suitable piece of touch paper in the touch hole, which would in its turn ignite the powder.

This could be brought about mechanically by exactly the same means that the rudder or elevator was altered in the last K. and M.A.A. steering competition—viz., a small propeller rotated by a strand of rubber against its natural method of rotation when travelling through the air, coupled with a suitable worm and cog reduction gear, which should in its turn complete the electric circuit and turn the turret if necessary. The method sounds somewhat complicated, but, in reality, it is not so, and could be made very light; only a few ounces in weight, as a matter of fact.

Instead of using electricity, we might use a mixture of chlorate of potash and sugar ignited by a drop of sulphuric acid. Two parts of chlorate of potash to one of powdered lump sugar. Any small absorbent material soaked in sulphuric acid would do, such as a tiny piece of string.

In this case an allowance of 4 ozs. should be ample. A large machine is therefore not necessary. One would experiment with the guns fired fore and aft, and then laterally and in intermediate positions. We should much like to see some experiments made; they should certainly prove not only interesting but even exciting.



#### KITE AND MODEL AEROPLANE ASSOCIATION.

##### Official Notices.

*Official Notices.*—After a consultation with Messrs. Hayden and Chown, of the Wimbledon District Club, on Saturday last, we regret to announce that owing to the continuous cold weather it has been found impossible to hold the

competition for compressed air models, as previously published in our notices, owing to the fact that the engine freezes up after one or two runs. The competition will, therefore, have to be postponed until more favourable weather prevails.

*Official Records.*—We sincerely hope to receive entries for attempts on the present official records, and that all secretaries will do their utmost to keep the interests of the Association at heart.

All communications to be addressed to H. A. Lyche, 46, Templesheen Road, East Sheen, S.W.

#### AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

**Leytonstone and District AeC.** (14, LEYTONSTONE RD., STRATFORD)

Nov. 29th, flying as usual, Wanstead Flats, 10 a.m., or meet at clubroom.

**Paddington and Districts** (77, SWINDERBY ROAD, WEMBLEY).

Nov. 28th, usual flying at Sudbury, 2.30 p.m. Dec. 5th, competition for twin-propeller models; prizes value 7s. 6d.



#### CORRESPONDENCE.

##### A British Company and that Lying Jade "Dame Rumour."

[1889] We shall be much obliged if you will kindly insert the following notice in the columns of your next issue:—

In view of the grossly inaccurate reports in circulation regarding the Directorate of this Company, we are compelled to draw attention to the following facts:—

1. That none of the Directors are of German, Austrian, Hungarian or Turkish nationality.
2. That, with the exception of the holder of one ordinary £1 share, none of the shareholders in this Company are of German, Austrian, Hungarian or Turkish nationality.

THE BRITISH EMAILLITE CO., LTD.,  
November 21st. H. BAYLEY, Sales Manager and Secretary.



#### Firth's Steel for Aeroplanes.

In reply to enquiries which have been made as to the makers of Firth's steel for aeroplanes which was described in our last issue, the address of the firm is Messrs. Thomas Firth and Sons, Ltd., 8, The Sanctuary, Westminster, S.W., and Sheffield.

#### Of Interest to Pilots.

We have received an urgent enquiry for a skilled pilot who would be prepared to supply and fly an aeroplane while certain experimental work of a highly confidential nature is being carried out. The amount of flying required would be comparatively small, and would last for a few days only. A remunerative fee will be available for the pilot undertaking the work. Applications should be addressed to the Editor, marked "Experimental," who will see that they are forwarded to the proper quarter.



#### PUBLICATION RECEIVED.

*Stability and Equilibrium of Floating Bodies.* By Bernard C. Laws, B.Sc., &c. London: Constable and Co., Ltd. Price 10s. 6d. net.

#### FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.  
Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

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